

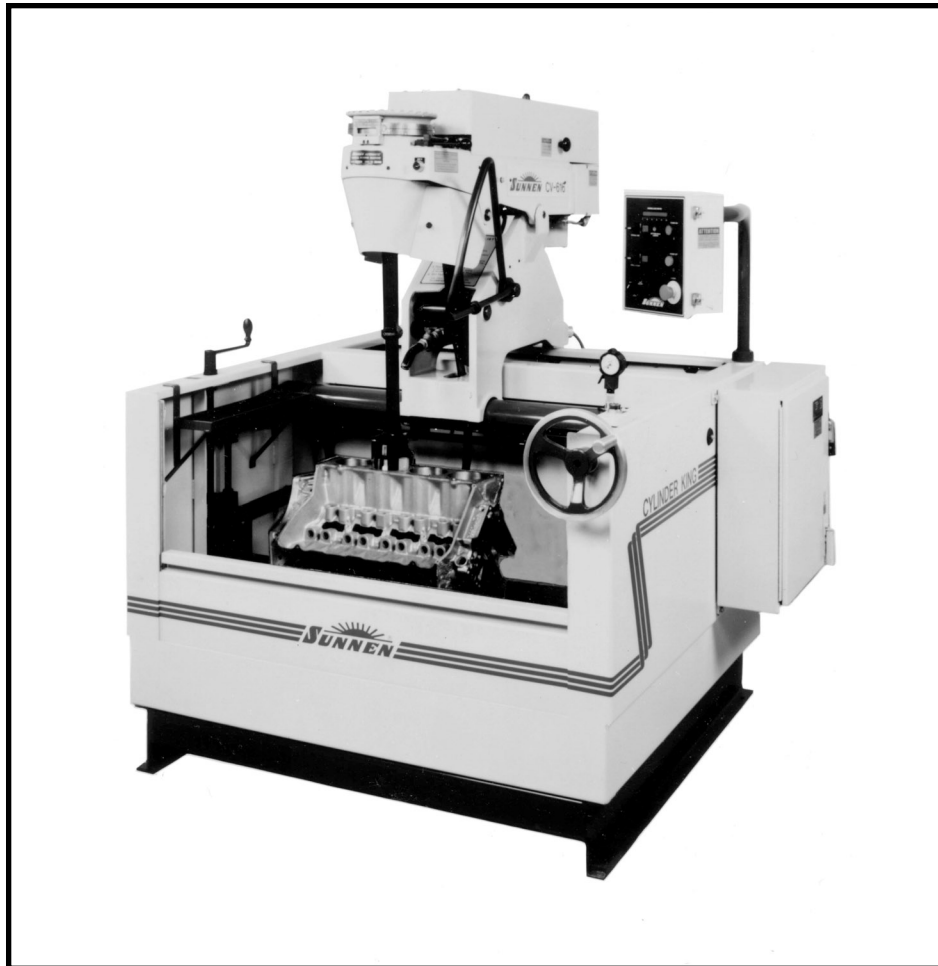


# REPAIR PARTS CATALOG FOR SUNNEN CYLINDER KING AUTOMATIC VERTICAL HONING MACHINE

## MODEL:

**CV-616**

THIS CATALOG COVERS THE  
ABOVE MODEL FROM SERIAL  
NO. 4333 TO 4721.



"SUNNEN, AND THE SUNNEN LOGO ARE TRADEMARKS OR REGISTERED TRADEMARKS OF SUNNEN® PRODUCTS COMPANY."



**SUNNEN PRODUCTS COMPANY**  
7910 MANCHESTER AVENUE • ST. LOUIS, MO 63143, U.S.A. • PHONE: 314-781-2100

X-CV-2900D

Like any machinery, this equipment may be dangerous if used improperly. Be sure to read and follow instructions for operation of equipment.

## INTRODUCTION

Illustrations show all major components in exploded detail. Item numbers on each illustration are keyed to the corresponding parts list, providing a descriptive identification of each part.

The parts lists include assemblies as well as detail parts. An item listed without a part number can be obtained as a component of the complete assembly of which it is a part.

Standard hardware items are listed with complete descriptions, such as Item 29 below. **These may be purchased at your local hardware store**, but it is important to replace an item with one having the same dimensions as the original. In some places brand names and part numbers are shown. These may change depending upon availability.

**Sunnens Products Company reserves the right to make changes, without notice, to materials, specifications, colors, designs and accessories included with units.**

## HOW TO ORDER

When ordering replacement parts be sure to include the following information to ensure prompt shipment of correct parts:

1. The part number and description of each part desired, obtained from this parts catalog.
2. The quantity of each part desired.
3. The voltage, frequency and phase, when ordering electrical parts.
4. The model and serial number of the machine, obtained from the name plate, where there is any question concerning a part.

## HOW TO USE THIS PARTS LIST

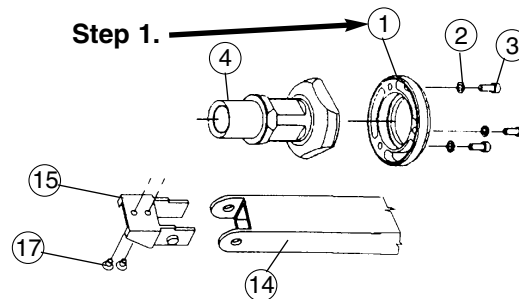
**Step 1.** – Locate desired part on illustration. Note item number.

**Step 2.** – Locate item number in the parts list.

**Step 3.** – If the item has a part number listed, order by part number and the description. A part number in light face type indicates that it is a component of the last preceding part number in bold face type.

**Step 4.** – If no number is listed, order the part number of the unit of which the desired part is a component.  
**ORDER ONLY BY PART NUMBER AND DESCRIPTION – NOT by item number.**

NOTE: In this manual, parts may be followed by “(For CE Machines)” or “(For Non-CE Machines)” to denote domestic machines from exported machines. The CE version is constructed to meet the requirements of the European market, and is available to any customer.



	ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
Step 2.	1	<b>MVH-4499A</b>	1	.... <b>Spindle Cap</b> <i>includes</i>
	2	PHSM-405	3	.....Screw (M6 x 1 x 16 SHCS)
Step 3.	3	PHW-354	3	.....Washer (M6)
	4	<b>MVH-4422</b>	1	.... <b>Inner Spindle Nose</b>
	14	<b>PEM-870A</b>	1	.... <b>Cable Carrier</b> <i>includes</i>
	15	PEM-871	1	.....Cable Carrier Bracket
Step 4.	16	PEM-872	1	.....Cable Carrier Bracket
	17	<b>PHSM-600</b>	1	.... <b>Screw</b> (M3 x 0,5 x 5mm FHCS)

## GENERAL INFORMATION

The Sunnen® equipment has been designed and engineered for a wide variety of parts within the capacity and limitation of the equipment. With proper care and maintenance this equipment will give years of service.

**READ THE FOLLOWING INSTRUCTIONS CAREFULLY AND THOROUGHLY BEFORE UNPACKING, INSPECTING, OR INSTALLING THIS EQUIPMENT.**

**IMPORTANT:** Read any supplemental instructions BEFORE installing this equipment. These supplemental instructions give you important information to assist you with the planning and installation of your Sunnen equipment.

Sunnen Technical Service Department is available to provide telephone assistance for installation, programming, & troubleshooting of your Sunnen equipment. All support is available during normal business hours, 8:00 AM to 4:30 PM Central Time. Emergency breakdown support is available on a 24 hour / 7 day basis.

Review all literature provided with your Sunnen equipment. This literature provides valuable information for proper installation, operation, and maintenance of your equipment. Troubleshooting information can also be found within the Instructions. If you cannot find what you need, call for technical support.

Where applicable, programming information for your Sunnen equipment is also included. Most answers can be found in the literature packaged with your equipment.

**Help us help you. When ordering parts, requesting information, or technical assistance about your equipment, please have the following information available:**

- Have ALL MANUALS on hand. The Customer Services Representative or Technician will refer to it.
- Have Model Number and Serial Number printed on your equipment Specification Nameplate.
- Where Applicable: Have Drive model and all nameplate data. Motor type, brand, and all nameplate data.

**For Troubleshooting, additional information may be required:**

- Power distribution information (type - delta, wye, power factor correction; other major switching devices used, voltage fluctuations)
- Installation Wiring (separation of power & control wire; wire type/class used, distance between drive and motor, grounding).
- Use of any optional devices/equipment between the Drive & motor (output chokes, etc.).

**For fast service on your orders call:**

Sunnen Automotive Customer Service toll free at: 1-800-772-2878

Sunnen Industrial Customer Service toll free at: 1-800-325-3670

Customers outside the USA, contact your local authorized Sunnen Distributor.

Additional information available at: <http://www.sunnen.com> or e-mail: [sunnen@sunnen.com](mailto:sunnen@sunnen.com)

**NOTE:** Sunnen reserves the right to change or revise specifications and product design in connection with any feature of our products contained herein. Such changes do not entitle the buyer to corresponding changes, improvements, additions, or replacements for equipment, supplies or accessories previously sold. Information contained herein is considered to be accurate based on available information at the time of printing. Should any discrepancy of information arise, Sunnen recommends that user verify the discrepancy with Sunnen before proceeding.

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## ESD PREVENTION REVIEW

Let's review the basics of a sound static control system and its effective implementation. First, in the three step plan:

1. Always ground yourself when handling sensitive components or assemblies.
2. Always use a conductive or shielded container during storage or transportation. These materials create a Faraday cage which will isolate the contents from static charges.
3. Open ESD safe containers only at a static safe work station.

At the static safe work station, follow these procedures before beginning any work:

- A. Put on your wrist strap or foot grounding devices.
- B. Check all grounding cords to make sure they are properly connected to ground, ensuring the effective dissipation of static charges.
- C. Make sure that your work surface is clean and clear of unnecessary materials, particularly common plastics.
- D. Anti-static bubble wrap has been included for use at the machine when an ESD safe workstation is not available.

You are now properly grounded and ready to begin work. Following these few simple rules and using a little common sense will go a long way toward helping you and your company in the battle against the hazards of static electricity. When you are working with ESD sensitive devices, make sure you:

**GROUND  
ISOLATE  
NEUTRALIZE**

## SUNNEN® LIMITED PRODUCT WARRANTY

Sunnen® Products Company and its subsidiaries (SPC) warrant that all new SPC honing machines, gaging equipment, tooling, and related equipment will be free of defects in material and/or workmanship for a period of one year from the date of original shipment from SPC.

Upon prompt notification of a defect during the one-year period, SPC will repair, replace, or refund the purchase price, with respect to parts that prove to be defective (as defined above). Any equipment or tooling which is found to be defective from improper use will be returned at the customer's cost or repaired (if possible) at customer's request. Customer shall be charged current rates for all such repair.

Prior to returning any SPC product, an authorization (RMA#) and shipping instructions must be obtained from the Customer Service Department or items sent to SPC will be returned to the customer.

**Warranty Limitations and Exclusions** This Warranty does not apply to the following:

- Normal maintenance items subject to wear and tear: (belts, fuses, filters, etc).
- Damages resulting from but not limited to:
  - › Shipment to the customer (for items delivered to customer or customer's agent F.O.B., Shipping Point)
  - › Incorrect installation including improper lifting, dropping and/or placement
  - › Incorrect electric power (beyond +/- 10% of rated voltage) including intermittent or random voltage spikes or drops
  - › Incorrect air supply volume and/or pressure and/or contaminated air supply
  - › Electromagnetic or radio frequency interference from surrounding equipment (EMI, RFI)
  - › Storm, lightning, flood or fire damage
  - › Failure to perform regular maintenance as outlined in SPC manuals
  - › Improper machine setup or operation causing a crash to occur
  - › Misapplication of the equipment
  - › Use of non-SPC machines, tooling, abrasive, fixturing, coolant, repair parts, or filtration
  - › Incorrect software installation and/or misuse
  - › Non-authorized customer installed electronics and/or software
  - › Customer modifications to SPC software

THE LIMITED WARRANTY DESCRIBED HEREIN IS EXPRESSLY IN LIEU OF ALL ANY OTHER WARRANTIES. SPC MAKES NO REPRESENTATION OR WARRANTY OF ANY OTHER KIND, EXPRESS OR IMPLIED, WHETHER AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER MATTER. SPC IS NOT RESPONSIBLE FOR THE IMPROPER USE OF ANY OF ITS PRODUCTS. SPC SHALL NOT BE LIABLE FOR DIRECT, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES INCLUDING BUT NOT LIMITED TO: LOSS OF USE, REVENUE, OR PROFIT. SPC ASSUMES NO LIABILITY FOR PURCHASED ITEMS PRODUCED BY OTHER MANUFACTURERS WHO EXTEND SEPARATE WARRANTIES. REGARDLESS OF ANY RIGHTS AFFORDED BY LAW TO BUYER, SPC'S LIABILITY, IF ANY, FOR ANY AND ALL CLAIMS FOR LOSS OR DAMAGES WITH RESPECT TO THE PRODUCTS, AND BUYER'S SOLE AND EXCLUSIVE REMEDY THEREFORE, SHALL IN ALL EVENTS BE LIMITED IN AMOUNT TO THE PURCHASE PRICE OF THAT PORTION OF THE PRODUCTS WITH RESPECT TO WHICH A VALID CLAIM IS MADE.

### Shipping Damages

Except in the case of F.O.B., Buyer's destination shipments, SPC will not be liable for any settlement claims for obvious and/or concealed shipping damages. The customer bears the responsibility to unpack all shipments immediately and inspect for damage. When obvious and/or concealed damage is found, the customer must immediately notify the carrier's agent to make an inspection and file a claim. The customer should retain the shipping container and packing material.

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Any alteration or reverse engineering of the software is expressly forbidden and is in violation of this agreement.

SPC reserves the right to update the software covered by this agreement at any time without prior notice and any such updates are covered by this agreement.

# **SAFETY INSTRUCTIONS**

## **READ FIRST**

This machine, like any equipment, may be dangerous if used improperly. Please read all warnings and instructions before attempting to use this machine.

Always disconnect power at main enclosure before servicing machine.<sup>1</sup>

Always wear eye protection when operating this machine.

NEVER open or remove any machine cover or protective guard with power "ON."  
Always disconnect power at main enclosure before servicing this equipment.<sup>1</sup>

DO NOT attempt any repair or maintenance procedure beyond those described in this book. Contact your Sunnen® Field Service Engineer or Technical Services Representative for repairs not covered in these instructions.

Due to the wide variety of machine configurations, all possibilities cannot be described in these instructions. Instructions for safe use and maintenance of optional equipment ordered through Sunnen, will be provided through separate documentation and/or training provided by your Sunnen Field Service Engineer or Technical Services Representative.

DO NOT attempt to defeat any safety device on this machine or on any of the optional equipment.

If specially built automation components are added to this system, be sure that safety is not compromised. If necessary, obtain special enlarged work area safety system from Sunnen Products Co.

 Indicates CE version ONLY.

<sup>1</sup> DO NOT touch electrical components until main input power has been turned off and *CHARGE* lamps are extinguished. WARNING: The capacitors are still charged and can be quite dangerous.

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# SECTION I DRIVE ARM ASSEMBLY

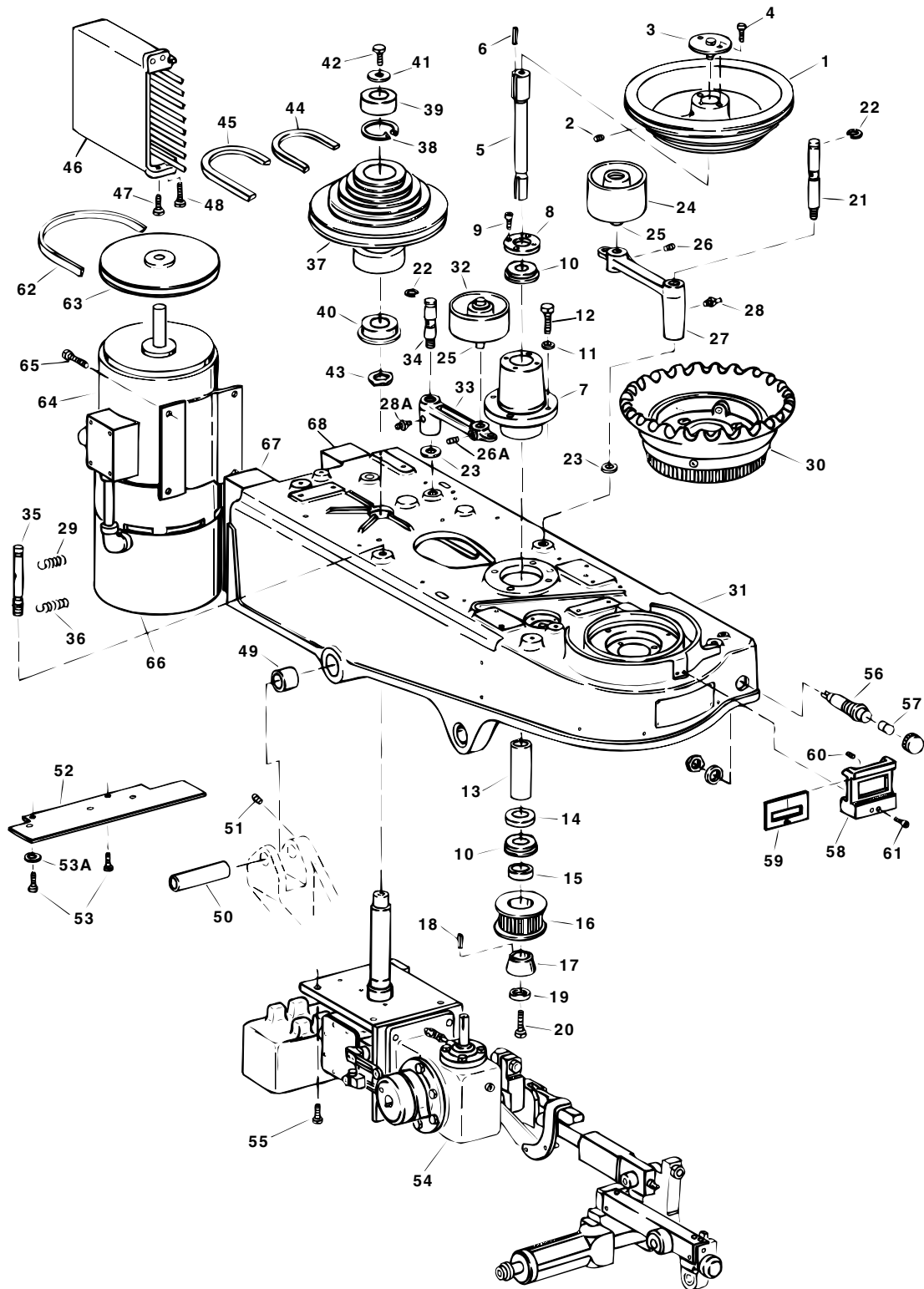


FIGURE A - DRIVE ARM



**PARTS LIST COVERING FIGURE "A"**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
<b>1</b>	<b>CV-206A</b>	<b>1</b>	<b>....Second Countershaft Pulley with</b>
2		1	.....Set Screw (1/4-20 x 1/2 Soc. Cup Pt.)
3	CV-610A	1	.....Lockplate with
4		2	.....Screws (1/4-20 x 5/8 But. Hd. Cap)
<b>5</b>	<b>CV-207A</b>	<b>1</b>	<b>....Second Countershaft with</b>
6		1	.....Key (3/16 Sq. x 1-3/8 Long)
18		1	.....Key (3/16 Sq. x 3/4 Long)
<b>7</b>	<b>CV-613A</b>	<b>1</b>	<b>....Bearing Support with</b>
8		1	.....Lockplate
9		4	.....Screws (10-24 x 3/4 Hex Hd. Cap)
10	PBR-12A	2	.....Bearing (Pkg. of 1)
11		4	.....Washer (3/8 Lock)
12		4	.....Screws (3/8-16 x 1-1/2 Hex Hd. Cap)
13	CV-208A	1	.....Spacer
14	PBR-13A	1	.....Bearing
15	CK-218A	1	.....Spacer
<b>16</b>	<b>CK-211A</b>	<b>1</b>	<b>....Timing Pulley with</b>
17		1	.....Taper Lock Bushing
18		1	.....Key (3/16 Sq. x 3/4 Long)
19	CK-219A	1	.....Washer
20		1	.....Screw (5/16-24 x 3/4 Hex Hd. Cap)
<b>21</b>	<b>CV-331A</b>	<b>1</b>	<b>....Idler Arm Shaft with</b>
22		1	.....Retaining Ring
23		1	.....Spring Washer
<b>24</b>	<b>CV-195A</b>	<b>1</b>	<b>....Idler Pulley Assembly with</b>
25	CV-197A	1	.....Bearing
26		1	.....Set Screw (5/16-18 x 1/2 Soc. Cup Pt.)
<b>27</b>	<b>CV-201A</b>	<b>1</b>	<b>....Idler Arm with</b>
26		1	.....Set Screw (5/16-18 x 1/2 Soc. Cup Pt.)
28		1	.....Grease Fitting
<b>29</b>	<b>CK-203A</b>	<b>1</b>	<b>....Tension Spring</b>
<b>30</b>		<b>1</b>	<b>....Hand Wheel (See Fig. "B")</b>
<b>31</b>		<b>1</b>	<b>....Drive Arm</b>
<b>32</b>	<b>CV-325A</b>	<b>1</b>	<b>....Idler Pulley Assembly with</b>
25	CV-197A	1	.....Bearing
26		1	.....Set Screw (5/16-18 x 1/2 Soc. Cup Pt.)

N/S indicates Not Shown

(Parts continued on next page)

**SECTION I**  
**DRIVE ARM ASSEMBLY**

**PARTS LIST COVERING FIGURE "A" (cont'd)**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
<b>33</b>	<b>CV-332A</b>	<b>1</b>	<b>....Idler Arm with</b>
26		1	.....Set Screw (5/16-18 x 1/2 Soc. Cup Pt.)
28		1	.....Grease Fitting
<b>34</b>	<b>CV-202A</b>	<b>1</b>	<b>....Idler Arm Shaft with</b>
22		1	.....Retaining Ring
23		1	.....Spring Washer
<b>35</b>	<b>CV-334A</b>	<b>1</b>	<b>....Idler Arm Spring Anchor</b>
<b>36</b>	<b>CK-333A</b>	<b>1</b>	<b>....Spring</b>
<b>37</b>	<b>CV-190A</b>	<b>1</b>	<b>....First Countershaft Pulley Assembly with</b>
38		1	.....Retaining Ring
39	PBR-36A	1	.....Bearing with Washer
40	MBB-335C	1	.....Bearing
41		1	.....End Cap
42		1	.....Screw (1/4-20 x 3/4 Hex Hd. Cap)
43	PHW-122A	1	.....Spring Washer
<b>44</b>	<b>CK-209A</b>	<b>1</b>	<b>...."V" Belt - Upper</b>
<b>45</b>	<b>CK-498A</b>	<b>1</b>	<b>...."V" Belt - Lower</b>
<b>46</b>		<b>1</b>	<b>....Electrical Terminal Box with</b>
N/S	CK-553A	1	.....Gasket
N/S	CK-552GA	1	.....Terminal Box Cover
<b>47</b>		<b>3</b>	<b>....Screws (1/4-20 x 7/8 Hex Hd. Cap &amp; Lock Washers)</b>
<b>48</b>		<b>1</b>	<b>....Screw (1/4-20 x 1" Hex Hd. Cap)</b>
<b>49</b>	<b>PBR-10A</b>	<b>2</b>	<b>....Bearing (Pkg. of 1)</b>
<b>50</b>	<b>CV-773A</b>	<b>2</b>	<b>....Pivot Shaft (Pkg. of 1) with</b>
51		2	.....Set Screw (5/16-18 x 3/4 Soc. Cup Pt.)
<b>52</b>	<b>CV-818A</b>	<b>1</b>	<b>....Shock Absorber Plate with</b>
53		1	.....Screw (1/4-20 x 3/4 Hex Hd. Cap)
53A		1	.....Washer (1/4 Lock)
<b>54</b>		<b>1</b>	<b>....Gear Reducer &amp; Related Parts (See Fig. "D")</b>
<b>55</b>		<b>4</b>	<b>....Screws (3/8-16 x 1" Hex Hd. Cap &amp; Lock Washers)</b>
<b>56</b>	<b>CK-156A</b>	<b>1</b>	<b>....Indicator Light with</b>
57	CK-1444A	1	.....Incandescent Lamp
<b>58</b>	<b>CV-605A</b>	<b>1</b>	<b>....Index Plate Assembly with</b>
59	CV-608A	1	.....Index Plate
60	CV-606A	1	.....Ball Plunger
61		2	.....Screws (10-24 x 1" Soc. Hd. Cap)
<b>58A</b>	<b>CV-605MA</b>	<b>1</b>	<b>....Index Plate Assembly (Metric) with</b>
59A	CV-608MA	1	.....Index Plate (Metric)
60	CV-606A	1	.....Ball Plunger
61		2	.....Screws (10-24 x 1" Soc. Hd. Cap)

N/S indicates Not Shown

(Parts continued on next page)

**PARTS LIST COVERING FIGURE "A" (cont'd)**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
62	CK-192A	1	....Flat Belt (3/4" wide x 51" long) 60 Hz
62	CV-267A	1	....Flat Belt (3/4" wide x 53" long) 50 Hz
63	CK-152A	1	....Motor Pulley (for 230/460 volt, 60 Hz, 3 Ph.) with
		1	.....Set Screw (5/16-18 x 1/2 Soc. Cup Pt.)
63	CK-152FA	1	....Motor Pulley (for 220/380/440 Volt, 50 Hz, 3 Ph.) with
		1	.....Set Screw (5/16-18 x 1/2 Soc. Cup Pt.)
64	PMO-822A	1	....Motor & Brake (2 HP, 208/230/460 V, 60 Hz, 380 V, 50 Hz)
66	CV-240A	1	....Motor Brake - Complete for PMO-822A
	CV-241A	1	....Coil Assembly for PMO-822A
64	PMO-823A	1	....Motor & Brake (2 HP, 220/440 V, 50 Hz)
66	CV-244A	1	....Motor Brake - Complete for PMO-823A
	CV-246A	1	....Coil Assembly for PMO-823A
65		4	....Screws (5/16-18 x 1-1/4 Hex Hd. Cap)
67		1	....Counterweight, Right
68		1	....Counterweight, Left
	CK-3451A	6	....Counterweight (1/8" thick) (Pkg. of 1) (Located in Handwheel - Item 30)

N/S indicates Not Shown

**SECTION I**  
**DRIVE ARM ASSEMBLY**

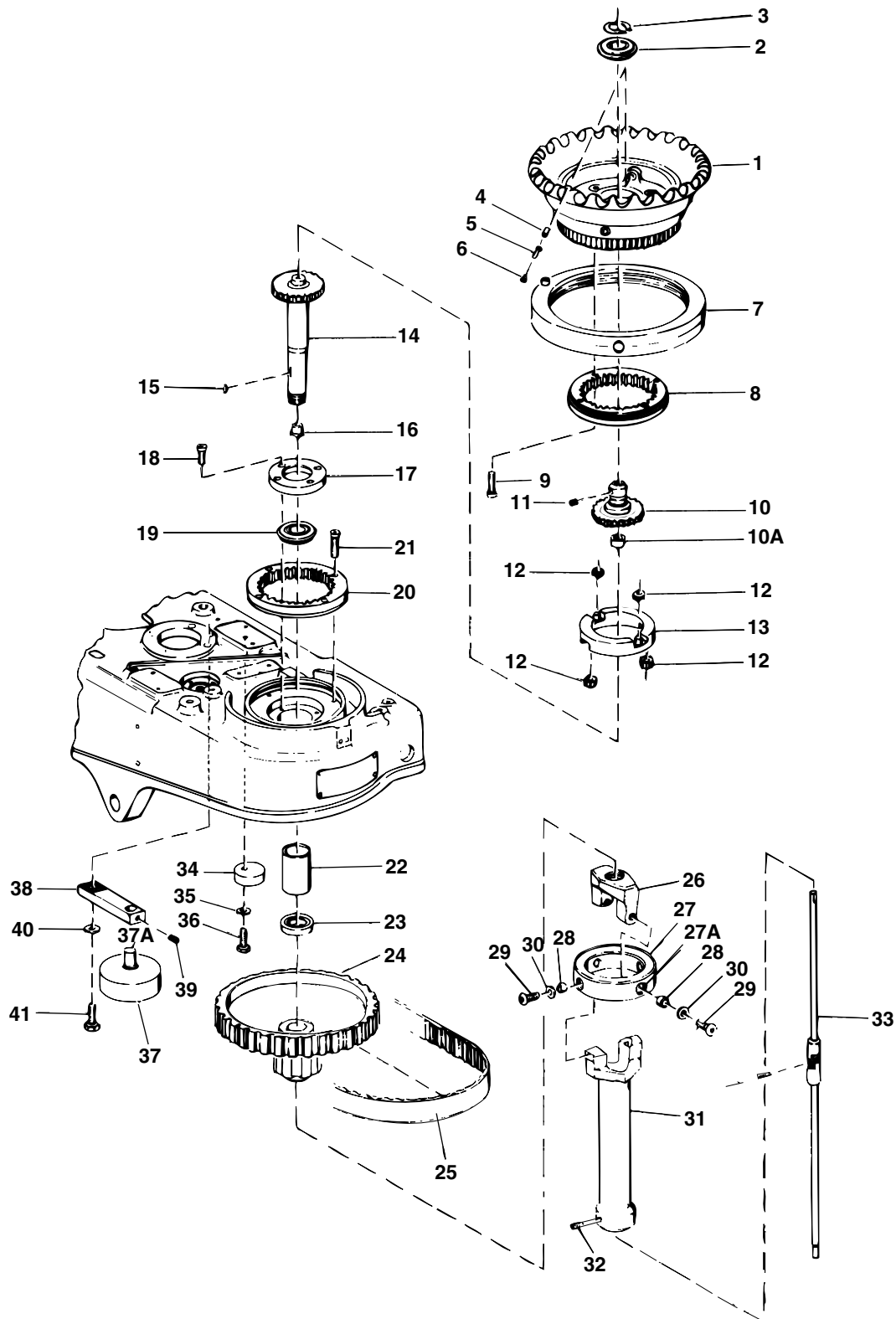


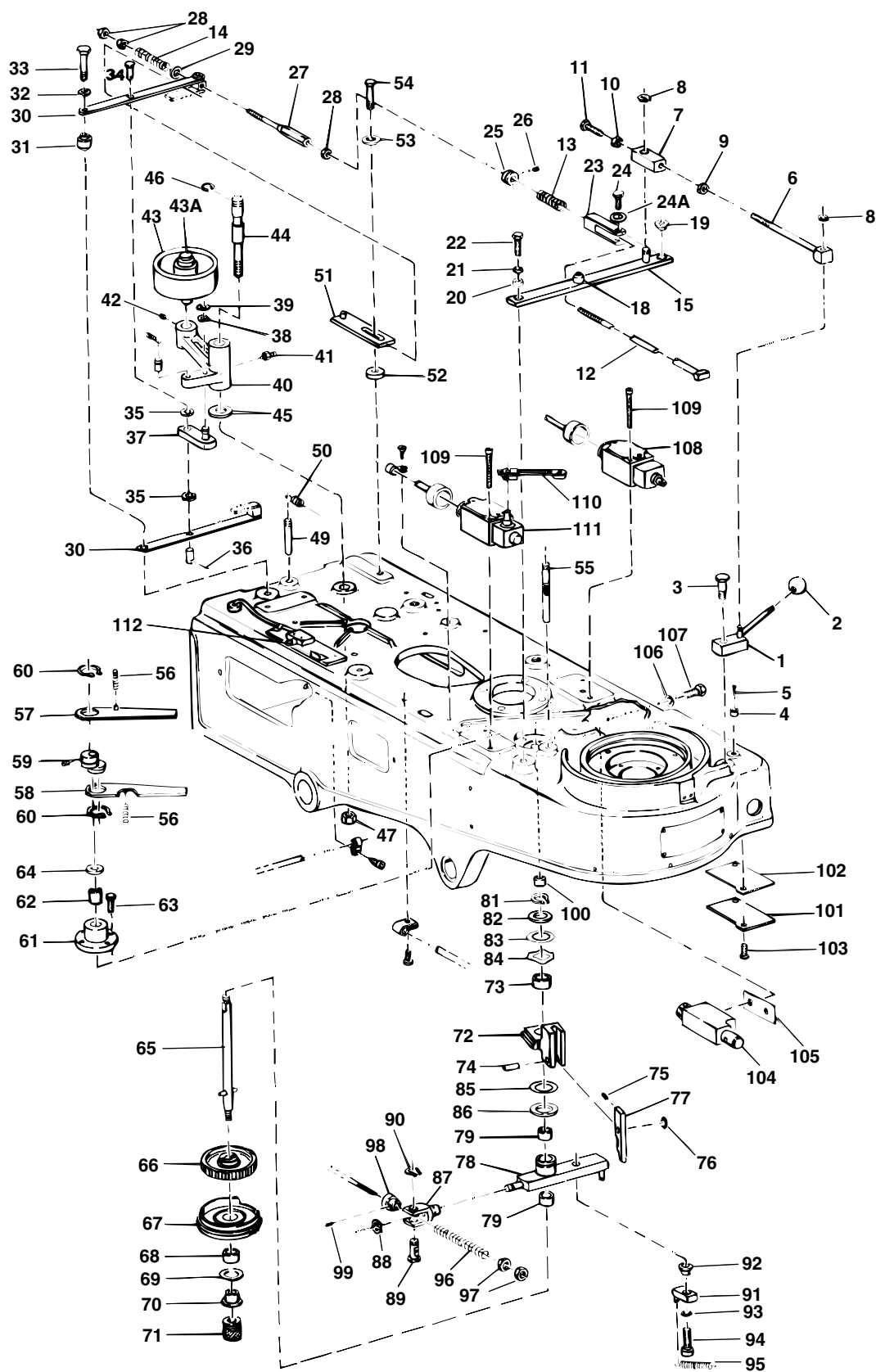
FIGURE B - DRIVE ARM

**PARTS LIST COVERING FIGURE "B"**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
	<b>CV-215A</b>	<b>1</b>	<b>....Hand Wheel Assembly</b> (.001" Graduations) <i>Includes</i>
1		1	.....Hand Wheel
2	MBB-335C	1	.....Bearing
3	PHR-303A	1	.....Retaining Ring
4	CK-226A	4	.....Plungers <i>with</i> (Pkg. of 4)
5	CK-227A	4	.....Springs (Pkg. of 4)
6		4	.....Set Screws (3/8-24 x 3/8 Soc. Cone Pt.)
7	CV-220A	1	.....Graduated Feed Dial Assembly (.001" Graduations)
8	CK-229A	1	.....Ring Gear <i>with</i>
9		4	.....Screws (10-24 x 1/2 Soc. Hd. Cap)
	<b>CV-215M-A</b>	<b>1</b>	<b>....Hand Wheel Assembly</b> - Metric (All parts the same as CV-215A except CV-220A is replaced with CV-220M-A Metric Graduated Feed Dial Assembly)
<b>10</b>	<b>CK-230A</b>	<b>1</b>	<b>....Upper Sun Gear Assembly</b> <i>with</i>
10A	CK-233A	1	.....Bushing
3	PHR-303A	1	.....Retaining Ring
11		1	.....Set Screw (3/8-24 x 3/8 Soc. Cup Pt.)
<b>12</b>	<b>CK-234A</b>	<b>4</b>	<b>....Planetary Gears</b> (Pkg. of 4)
<b>13</b>	<b>CK-235A</b>	<b>1</b>	<b>....Planetary Cage Assembly</b>
<b>N/S</b>	<b>CK-238A</b>	<b>1</b>	<b>....Grease</b> (1 Lb. Can)
<b>14</b>	<b>CK-240A</b>	<b>1</b>	<b>....Spindle &amp; Sun Gear</b> <i>with</i>
15		1	.....Key
16	CK-242A	1	.....Nylon Bearing
<b>17</b>	<b>CK-246A</b>	<b>1</b>	<b>....Spindle Bearing Retainer Ring</b> <i>with</i>
18		4	.....Screws (1/4-20 x 5/8 Soc. Hd. Cap)
<b>19</b>	<b>MBB-335C</b>	<b>1</b>	<b>....Bearing</b>
<b>20</b>	<b>CK-229A</b>	<b>1</b>	<b>....Ring Gear</b> <i>with</i>
21		4	.....Screws (10-24 x 1/2 Soc. Hd. Cap)
<b>22</b>	<b>CK-243A</b>	<b>1</b>	<b>....Spindle Bearing Spacer</b>
<b>23</b>	<b>MBB-340A</b>	<b>1</b>	<b>....Spindle Bearing</b>
<b>24</b>	<b>CK-248A</b>	<b>1</b>	<b>....Spindle Pulley</b> <i>with</i>
15		1	.....Key
<b>25</b>	<b>CK-252A</b>	<b>1</b>	<b>....Timing Belt</b>
<b>26</b>	<b>CV-251A</b>	<b>1</b>	<b>....Drive Yoke</b>
<b>27</b>	<b>CV-1825A</b>	<b>1</b>	<b>....Upper Universal Ring Assembly</b> <i>with</i>
27A	PBR-23A	4	.....Needle Bearings (Pkg. of 4)
28	PBR-24A	4	.....Inner Races (Pkg. of 4) <i>with</i>
29	PHS-522A	4	.....Screws (5/16-24 x 7/8 Soc. But. Hd. Cap) (Pkg. of 4)
30		4	.....Washers (Special)
<b>31</b>	<b>CV-1830A</b>	<b>1</b>	<b>....Drive Tube</b> - Upper Half <i>with</i>
32	CK-1823A	1	.....Locking Screw
<b>33</b>	<b>CV-1835A</b>	<b>1</b>	<b>....Upper Feed Tube and "U" Joint Assembly</b> <i>with</i>
11		1	.....Set Screw (3/8-24 x 3/8 Soc. Cup Pt.)
<b>34</b>	<b>CK-328A</b>	<b>1</b>	<b>....Back Stop</b> for Timing Belt <i>with</i>
35		1	.....Washer (3/8 Plain)
36		1	.....Screw (3/8-16 x 1" Hex Hd. Cap)
<b>37</b>	<b>CK-160A</b>	<b>1</b>	<b>....Idler Pulley Assembly</b> <i>with</i>
37A	CK-162A	1	.....Bearing
<b>38</b>	<b>CK-323A</b>	<b>1</b>	<b>....Final Drive Idler Arm</b> <i>with</i>
39		1	.....Set Screw (5/16-18 x 5/16 Soc. Cup Pt.)
40		1	.....Washer (1/2 Lock)
41		1	.....Screw (1/2-13 x 1-1/4 Hex Hd. Cap)

N/S indicates Not Shown

**SECTION I**  
**DRIVE ARM ASSEMBLY**



**FIGURE C – DRIVE ARM**

**PARTS LIST COVERING FIGURE "C"**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
<b>1</b>	<b>CK-345A</b>	<b>1</b>	<b>....Clutch Control Lever Assembly with</b>
2	CK-348A	1	.....Knob
<b>3</b>	<b>CK-352A</b>	<b>1</b>	<b>....Clutch Handle Pivot Screw</b>
<b>4</b>	<b>CK-353A</b>	<b>1</b>	<b>....Stop Sleeve with</b>
5		1	.....Screw (10-24 x 3/4 Soc. Hd. Cap)
<b>6</b>	<b>CK-355A</b>	<b>1</b>	<b>....Clutch Pull Rod Assembly (Front) with</b>
7	CK-358A	1	.....Adjusting Link
8	PHR-305A	2	.....Retaining Ring (Pkg. of 1)
9		1	.....Nut (5/16-18 Hex Jam)
10		1	.....Nut (5/16-18 Hex)
11		1	.....Screw (5/16-18 x 3/4 Hex Hd. Cap)
<b>12</b>	<b>CK-365A</b>	<b>1</b>	<b>....Clutch Pull Rod Assembly (Rear) with</b>
13	EL-11A	1	.....Spring
14	CK-374A	1	.....Spring
	<b>CK-335A</b>	<b>1</b>	<b>....Feed Finger Release Bar Assembly Includes</b>
15		1	.....Release Bar
18	CK-339A	1	.....Nylon Sleeve
<b>19</b>	<b>CK-368A</b>	<b>1</b>	<b>....Sleeve</b>
<b>20</b>	<b>CK-341A</b>	<b>1</b>	<b>....Sleeve with</b>
21		1	.....Washer (3/8 Plain)
22		1	.....Screw (3/8-16 x 1" Hex Hd. Cap)
<b>23</b>	<b>CK-364A</b>	<b>1</b>	<b>....Clevis with</b>
24		1	.....Screw (5/16-18 x 1" Hex Hd. Cap)
24A		1	.....Washer (5/16 Lock)
<b>25</b>	<b>CK-371A</b>	<b>1</b>	<b>....Set Collar with</b>
26		1	.....Set Screw (10-32 x 1/4 Soc. Cup Pt.)
<b>27</b>	<b>CK-373A</b>	<b>1</b>	<b>....Clutch Adjusting Nut with</b>
28		3	.....Nuts (5/16-18 Hex)
29		1	.....Spacer
14	CK-374A	1	.....Spring
<b>30</b>	<b>CK-175A</b>	<b>1</b>	<b>....Clutch Actuating Arm Assembly with</b>
31	CK-183A	1	.....Shouldered Pivot Spacer
32		1	.....Washer (5/16 Plain)
33		1	.....Screw (5/16-18 x 1-1/2 Hex Hd. Cap)
34	CK-182A	1	.....Clevis Pin
35		2	.....Spacers
36		1	.....Hair Pin Cotter
<b>37</b>	<b>CK-165A</b>	<b>1</b>	<b>....Connecting Link Assembly with</b>
38		1	.....Washer (5/16 Plain)
39	PHR-302A	1	.....Retaining Ring

N/S indicates Not Shown

(Parts continued on next page)

**SECTION I**  
**DRIVE ARM ASSEMBLY**

**PARTS LIST COVERING FIGURE "C" (cont'd)**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
<b>40</b>	<b>CK-163A</b>	<b>1</b>	<b>....Clutch Idler Arm &amp; Pin with</b>
41		1	.....Grease Fitting
42		1	.....Set Screw (5/16-18 x 1/2 Soc. Cup Pt.)
<b>43</b>	<b>CK-160A</b>	<b>1</b>	<b>....Idler Pulley Assembly with</b>
43A	CK-162A	1	.....Bearing
<b>44</b>	<b>CK-164A</b>	<b>1</b>	<b>....Clutch Idler Arm Shaft with</b>
45		1	.....Washer (5/8 Plain)
46	PHR-301A	1	.....Retaining Ring
47		1	.....Nut (1/2-13 Hex)
<b>49</b>		<b>1</b>	<b>....Clutch Spring Anchor Pin</b>
<b>50</b>	<b>CK-172A</b>	<b>1</b>	<b>....Spring</b>
<b>51</b>	<b>CK-185A</b>	<b>1</b>	<b>....Clutch Stop Assembly with</b>
52		1	.....Spacer
53		1	.....Washer (Special)
54		1	.....Screw (3/8-16 x 1" Hex Hd. Cap)
<b>55</b>		<b>1</b>	<b>....Spring Anchor Pin</b>
<b>56</b>	<b>CK-267A</b>	<b>2</b>	<b>....Springs (Pkg. of 2)</b>
<b>57</b>	<b>CK-255A</b>	<b>1</b>	<b>....Feed Pawl - Upper</b>
<b>58</b>	<b>CK-265A</b>	<b>1</b>	<b>....Feed Pawl - Lower</b>
<b>59</b>	<b>CK-269A</b>	<b>1</b>	<b>....Double Eccentric with</b>
		1	.....Set Screw (1/4-28 x 5/16 Soc. Cup Pt.)
60	PHR-304A	2	.....Retaining Rings (Pkg. of 2)
	<b>CK-270A</b>	<b>1</b>	<b>....Clutch Housing Ass'y &amp; Ratchet Feed Shaft Assembly Includes</b>
61	CK-271A	1	.....Clutch Housing with
62	PBR-27A	1	.....Clutch & Bearing Assembly
63		4	.....Screws (10-24 x 1/2 Soc. Hd. Cap)
64	PBR-25A	1	.....Thrust Bearing
65	CK-280A	1	.....Ratchet Feed Shaft Assembly
<b>66</b>	<b>CK-89A</b>	<b>1</b>	<b>....Ratchet Wheel</b>
	<b>CK-90A</b>	<b>1</b>	<b>....Selector Cover Assembly Includes</b>
67		1	.....Selector Cover
68	PBR-30A	1	.....Bearing
69		1	.....Nylon Thrust Bearing
<b>70</b>	<b>CK-92A</b>	<b>1</b>	<b>....Shoulder Bushing</b>
<b>71</b>	<b>CK-312A</b>	<b>1</b>	<b>....Retaining Nut</b>
	<b>CK-120A</b>	<b>1</b>	<b>....Selector Body Assembly Includes</b>
72		1	.....Selector Body
73	PBR-31A	1	.....Bearing
74		1	.....Groov-Pin
75	PSP-101A	1	.....Compression Spring
76		1	.....Spring Washer
77		1	.....Selector Lever

N/S indicates Not Shown

(Parts continued on next page)



**PARTS LIST COVERING FIGURE "C" (cont'd)**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
	<b>CK-290A</b>	<b>1</b>	<b>....Ratchet Arm Assembly Includes</b>
78		1	.....Arm & Hub Assembly
79	CK-293A	2	.....Bushings (Pkg. of 2)
81	PHR-311A	1	.....Retaining Ring
82		1	.....Washer (1-1/64 Plain)
83	CK-123A	1	.....Nylon Thrust Washer
84	PHW-122A	1	.....Wave Spring Washer
85	CK-118A	1	.....Nylon Thrust Washer
86	CK-117A	1	.....Washer (Special)
87	CK-296A	1	.....Clevis with
88	PHR-305A	1	.....Retaining Ring
89	CK-297A	1	.....Swivel Pin with
90	PHR-306A	1	.....Retaining Ring
91	CK-125A	1	.....Ratchet Pawl Assembly with
92	CK-308A	1	.....Shoulder Bushing
93		1	.....Washer (1/4 Plain)
94		1	.....Screw (1/4-28 x 1" Soc. Hd. Cap)
95	CK-309A	1	.....Spring
96	<b>CK-317A</b>	<b>1</b>	<b>....Spring with</b>
97		2	.....Nuts (5/16-24 Hex)
98	<b>CK-318A</b>	<b>1</b>	<b>....Shouldered Set Collar with</b>
99		1	.....Set Screw (10-32 x 1/4 Soc. Cup Pt.)
100	<b>CK-293A</b>	<b>1</b>	<b>....Bushing (Pkg. of 2)</b>
101	<b>CK-157A</b>	<b>1</b>	<b>....Pilot Light Cover Plate with</b>
102		1	.....Cover Plate Gasket
103		2	.....Screws (10-24 x 1/2 Truss Hd.)
104	<b>CK-530A</b>	<b>1</b>	<b>....Rocker Stop Assembly with</b>
105		2	.....Shims
106		2	.....Washers (3/8 Lock)
107		2	.....Screws (3/8-16 x 1" Hex Hd. Cap)
108	<b>CK-362A</b>	<b>1</b>	<b>....Switch</b>
N/S	<b>CK-214A</b>	<b>1</b>	<b>....Contact Block for Above Switch</b>
109		4	<b>....Screws (10-32 x 2" Rd. Hd.)</b>
110	<b>CK-431A</b>	<b>1</b>	<b>....Switch Arm</b>
111	<b>CK-213A</b>	<b>1</b>	<b>....Switch</b>
N/S	<b>CK-214A</b>	<b>1</b>	<b>....Contact Block For Above Switch</b>

N/S indicates Not Shown

**SECTION I**  
**DRIVE ARM ASSEMBLY**

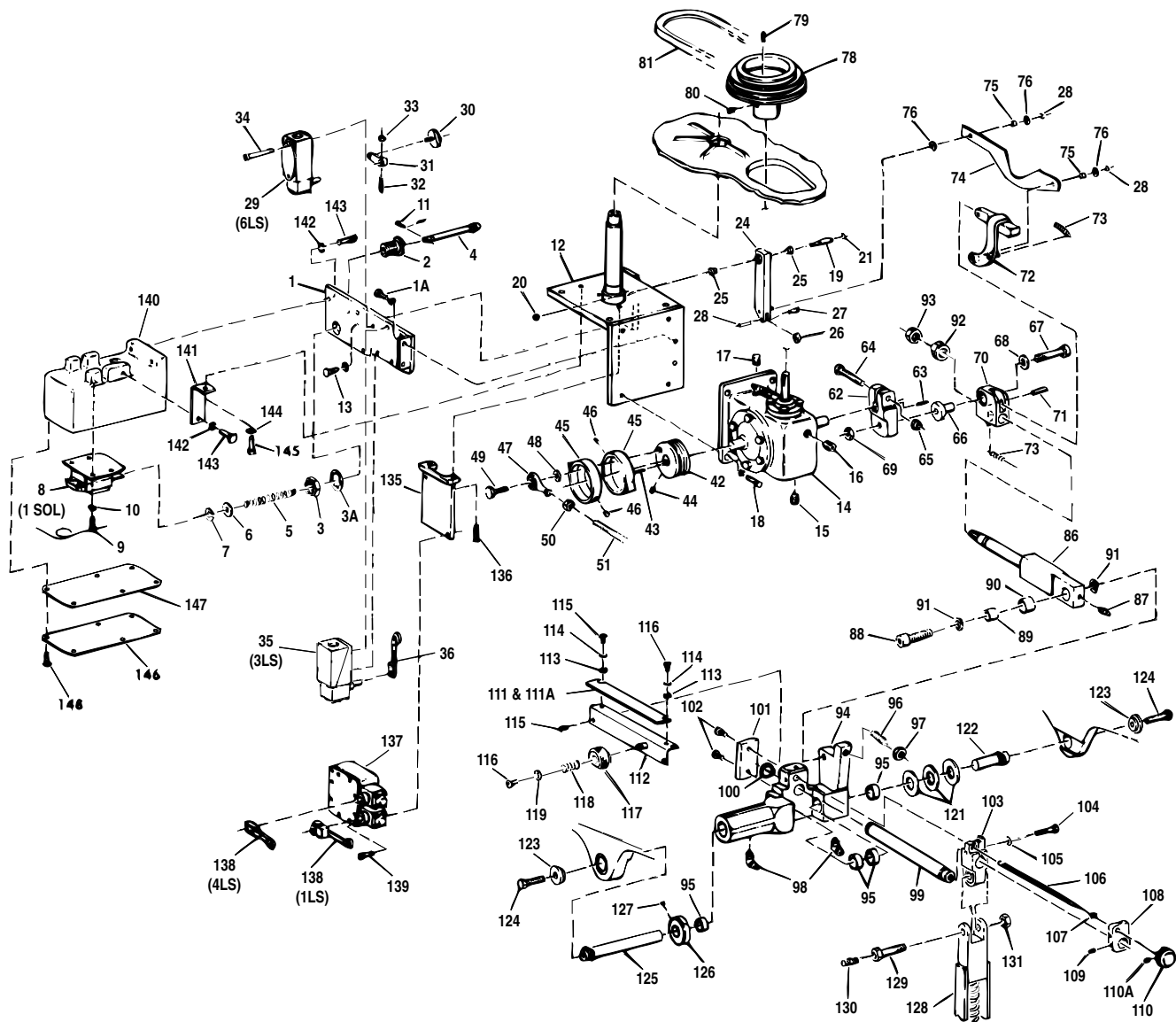


FIGURE D – GEAR REDUCER & RELATED PARTS

**PARTS LIST COVERING FIGURE "D"**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
<b>1</b>	<b>CV-625A</b>	<b>1</b>	<b>....Side Plate with</b>
1A		2	.....Screws (1/4-20 x 5/8 Hex Hd. Cap)
		2	.....Washers (1/4 Lock)
<b>2</b>	<b>CK-401C</b>	<b>1</b>	<b>....Threaded Sleeve with</b>
3		1	.....Nut (7/8-14 Hex Jam)
3A		1	.....Lockwasher (7/8 Shakeproof)
<b>4</b>	<b>CK-402A</b>	<b>1</b>	<b>....Solenoid Plunger with</b>
5	CK-403A	1	.....Spring
6		1	.....Washer (1/2 Plain)
7	PHR-307A	1	.....Retaining Ring
<b>8</b>	<b>CK-404C</b>	<b>1</b>	<b>....Solenoid with</b>
9		4	.....Screws (1/4-20 x 1/2 Soc. Hd. Cap)
10		4	.....Washers (1/4 Lock)
<b>11</b>	<b>CK-407A</b>	<b>1</b>	<b>....Clevis Pin with Cotter</b>
<b>12</b>	<b>CV-390A</b>	<b>1</b>	<b>....Angle Bracket with Washer</b>
<b>13</b>		<b>2</b>	<b>....Screws (1/4-20 x 5/8 Hex Hd. Cap)</b>
		<b>2</b>	<b>....Washers (1/4 Lock)</b>
<b>14</b>	<b>CV-446A</b>	<b>1</b>	<b>....Gear Reducer with</b>
15		1	.....Oil Drain Plug
16		1	.....Oil Level Plug
17		1	.....Oil Filler & Vent Plug
18		4	.....Screws (3/8-16 x 1" Hex Hd. Cap)
		4	.....Washers (3/8 Lock)
<b>N/S</b>	<b>CK-439A</b>	<b>1</b>	<b>....Bearing Set For CV-446A Gear Reducer - (7/8" Shaft)</b>
<b>N/S</b>	<b>CK-443A</b>	<b>1</b>	<b>....Replacement Shaft Kit For CV-446A Gear Reducer - (7/8" Shaft) with</b>
N/S	CK-442A	2	.....Gaskets (Pkg. of 2)
N/S	CK-444A	2	.....Grease Seals (Pkg. of 1)
<b>N/S</b>	<b>CK-438A</b>	<b>1</b>	<b>....Bearing Set For CV-446A Gear Reducer - (5/8" Shaft)</b>
<b>N/S</b>	<b>CK-454A</b>	<b>1</b>	<b>....Grease Seal For 5/8" Shaft</b>
<b>N/S</b>	<b>CK-448A</b>		<b>....Gear Oil For CV-446A Gear Reducer (One Quart)</b>
<b>N/S</b>	<b>CV-451A</b>	<b>1</b>	<b>....Slow Speed Worm Gear (Bronze)</b>
<b>N/S</b>	<b>CV-452A</b>	<b>1</b>	<b>....High Speed Worm &amp; Shaft Integral</b>
<b>19</b>	<b>CK-408A</b>	<b>1</b>	<b>....Shoulder Stud with</b>
20		1	.....Nut (1/4-20 Hex)
21	PHR-305A	1	.....Retaining Ring
<b>24</b>	<b>CK-410A</b>	<b>1</b>	<b>....Arm Assembly with</b>
25	CK-414A	2	.....Bearings (Pkg. of 2)
26	CK-416A	1	.....Roller
27	CK-417A	1	.....Pin
28	PHR-308A	1	.....Retaining Ring
<b>29</b>	<b>CK-421A</b>	<b>1</b>	<b>....Switch</b>
<b>N/S</b>	<b>CK-214A</b>	<b>1</b>	<b>....Contact Block For Above Switch</b>
<b>30</b>	<b>CK-422A</b>	<b>1</b>	<b>....One Way Roller (Includes Washer &amp; Nut) with</b>
N/S	CK-422-2A	1	.....Spring
31	CK-423A	1	.....Switch Arm with
32		1	.....Locking Screw
33		1	.....Nut (10-32 Hex)
<b>34</b>		<b>2</b>	<b>....Screws (10-32 x 1-3/4 Soc. Hd. Cap)</b>
<b>35</b>	<b>PES-151A</b>	<b>1</b>	<b>....Switch</b>
<b>36</b>	<b>PES-200A</b>	<b>1</b>	<b>....Switch Arm</b>

N/S indicates Not Shown

(Parts continued on next page)

**SECTION I**  
**DRIVE ARM ASSEMBLY**

**PARTS LIST COVERING FIGURE "D" (cont'd)**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
42	CV-447A	1	....Feed Crank <i>with</i>
43		1	.....Key (3/16 Sq. x 3/4 Long)
44		1	.....Set Screw (5/16-18 x 1/2 Soc. Cup Pt.)
45	CK-455A	2	....Adjustable Cam Rings (Pkg. of 1) <i>with</i>
46		2	.....Set Screw (1/4-20 x 3/8 Soc. Full Dog Pt.)
47	CK-319A	1	....Spherical Rod End <i>with</i>
48		1	.....Spacer Washer
49		1	.....Screw (5/16-24 x 1" Hex Hd. Cap)
50		1	.....Nut (5/16-24 Hex)
51	CV-316A	1	....Feed Push Rod
62	CK-458C	1	....Stroking Crank Kit <i>with</i>
63		1	.....Key (3/16 Sq. x 1" Long)
64		1	.....Screw (7/16-20 x 1-3/4 Soc. Hd. Cap)
65		1	.....Locknut (7/16-20 Hex)
66	CK-459A	1	.....Flange Bushing
67		1	.....Screw (1/2-20 x 2-1/2 Soc. Hd. Cap)
68		1	.....Washer (Special)
69		1	.....Locknut (1/2-20 Hex)
70	CK-465C	1	....Stroke Release Block <i>with</i>
71		1	.....Pin
72	CK-470A	1	....Stroke Release Pawl
73	CK-477A	1	....Spring
	CV-490A	1	....Actuating Link Assembly <i>Includes</i>
74	CV-491A	1	.....Actuating Link
75	CK-492A	2	.....Bushings (Pkg. of 2)
76		3	.....Washers (1/4 Flat with C'sink)
28	PHR-308A	2	.....Retaining Rings (Pkg. of 1)
78	CV-494A	1	....Gear Reducer Pulley <i>with</i>
79		1	.....Key (3/16 Sq. x 1" Long)
80		1	.....Set Screw (15/16-18 x 3/8 Soc. Cup Pt.)
81	CK-498A	1	...."V" Belt - Lower
86	CV-538A	1	....Connecting Rod <i>with</i>
87		1	.....Grease Fitting
88	CV-638A	1	.....Screw <i>with</i>
89	PBR-40A	1	.....Bearing
90	PBR-16A	1	.....Bearing
91		2	.....Washers (Special) (Pkg. of 2)
92	CK-541A	1	.....Adjusting Nut
93		1	.....Nut (1/2-20 Hex)
	CV-505A	1	....Stroking Rocker Assembly (For 60 Hz Machines) <i>Includes</i>
94		1	.....Stroking Rocker
95	PBR-10A	4	.....Bearings (Pkg. of 1)
96	CK-503A	1	.....Set Screw (Special)
97		1	.....Nut (1/2-13 Hex Jam)
98		2	.....Grease Fittings
99	CV-508A	1	.....Stroking Arm <i>with</i>
100	PHR-327A	1	.....Retaining Ring
101	CV-507A	1	.....Retaining Plate <i>with</i>
102		2	.....Screws (1/4-20 x 1" Soc. Hd. Cap)

N/S indicates Not Shown

(Parts continued on next page)

**PARTS LIST COVERING FIGURE "D" (cont'd)**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
103	CK-515A	1	.....Sliding Clamp Assembly <i>Includes</i>
N/S	PBR-17A	1	.....Bearing
104		1	.....Screw (5/16-24 x 1-1/4 Hex Hd. Cap)
105		1	.....Washer (5/16 Plain)
106	CV-509A	1	.....Stroke Adjusting Screw <i>with</i>
107		1	.....Washer (9/32 Plain)
108	CK-517A	1	.....End Plate <i>with</i>
109		1	.....Set Screw (10-32 x 3/8 Soc. Cup Pt.)
110	CV-521A	1	.....Adjusting Knob <i>with</i>
110A		1	.....Set Screw (10-32 x 1/4 Soc. Cup Pt.)
111	CV-1275A	1	.....Stroke Plate (Inches)
112	CV-522A	1	.....Angle Plate <i>with</i>
113	CK-513A	2	.....Spacers (Pkg. of 2)
114		2	.....Washers (Special)
115		4	.....Screws (10-32 x 3/8 But. Hd. Cap)
116		1	.....Screw (10-32 x 1/4 But. Hd. Cap)
117	CK-511A	1	.....Knob <i>with</i>
118		1	.....Spring
119		1	.....Washer (Special)
116		1	.....Screw (10-32 x 1/4 But. Hd. Cap)
	<b>CV-505M-A</b>	<b>1</b>	<b>....Metric Stroking Rocker Kit</b> (For 50 HZ Machines) (All Parts the same as CV-505A except Item 111 is replaced by item 111A)
111A	CV-1275M-A	1	.....Stroke Plate (Millimeters)
121	<b>CK-523A</b>	*	<b>....Spacer Washer</b> (Pkg. of 3)
122	<b>CV-651A</b>	<b>1</b>	<b>....Short Stub Shaft</b> <i>with</i>
123	CV-653A	2	.....Step Washers (Pkg. of 1)
124		1	.....Screw (1/2-13 x 1-1/2 Hex Hd. Cap)
125	<b>CV-652A</b>	<b>1</b>	<b>....Long Stub Shaft</b> <i>with</i>
123	CV-653A	2	.....Step Washers (Pkg. of 1)
124		1	.....Screw (1/2-13 x 1-1/2 Hex Hd. Cap)
126	<b>CV-527A</b>	<b>1</b>	<b>....Stop Collar</b> <i>with</i>
127		1	.....Set Screw (1/4-20 x 1/4 Soc. Cup Pt.)
128	<b>CV-785A</b>	<b>1</b>	<b>....Connecting Link Assembly</b> <i>with</i>
129	CK-742A	1	.....Screw
130		2	.....Grease Fittings
131		2	.....Nuts (1/2-20 Hex)
N/S	CK-796A	1	.....Screw (At lower end of Item 128)
N/S		2	.....Spacers (At lower end of item 128)
135	<b>CV-646A</b>	<b>1</b>	<b>....Switch Bracket</b> <i>with</i>
136		2	.....Screws (1/4-20 x 3/4 Soc. Hd. Cap)
137	<b>PES-117A</b>	<b>1</b>	<b>....Switch</b>
138	<b>CK-431A</b>	<b>2</b>	<b>....Switch Arms</b> (Pkg. of 1)
139		<b>2</b>	<b>....Screws</b> (10-32 x 3/4 Soc. Hd. Cap)
140	<b>CV-628A</b>	<b>1</b>	<b>....Solenoid Case</b> <i>with</i>
141	CV-634A	1	.....Hook
142		3	.....Washers (5/16 Lock)
143		3	.....Screws (5/16-18 x 1" Hex Hd. Cap)
144		1	.....Washer (1/4 Lock)
145		1	.....Screw (1/4-20 x 3/4 Hex Hd. Cap)
146	<b>CV-637A</b>	<b>1</b>	<b>....Cover</b> <i>with</i>
147	CV-636A	1	.....Gasket
148		6	.....Screws (10-32 x 1/2 Rd. Hd. I.M.S.)

N/S indicates Not Shown

SECTION II  
CARRIAGE ASSEMBLY

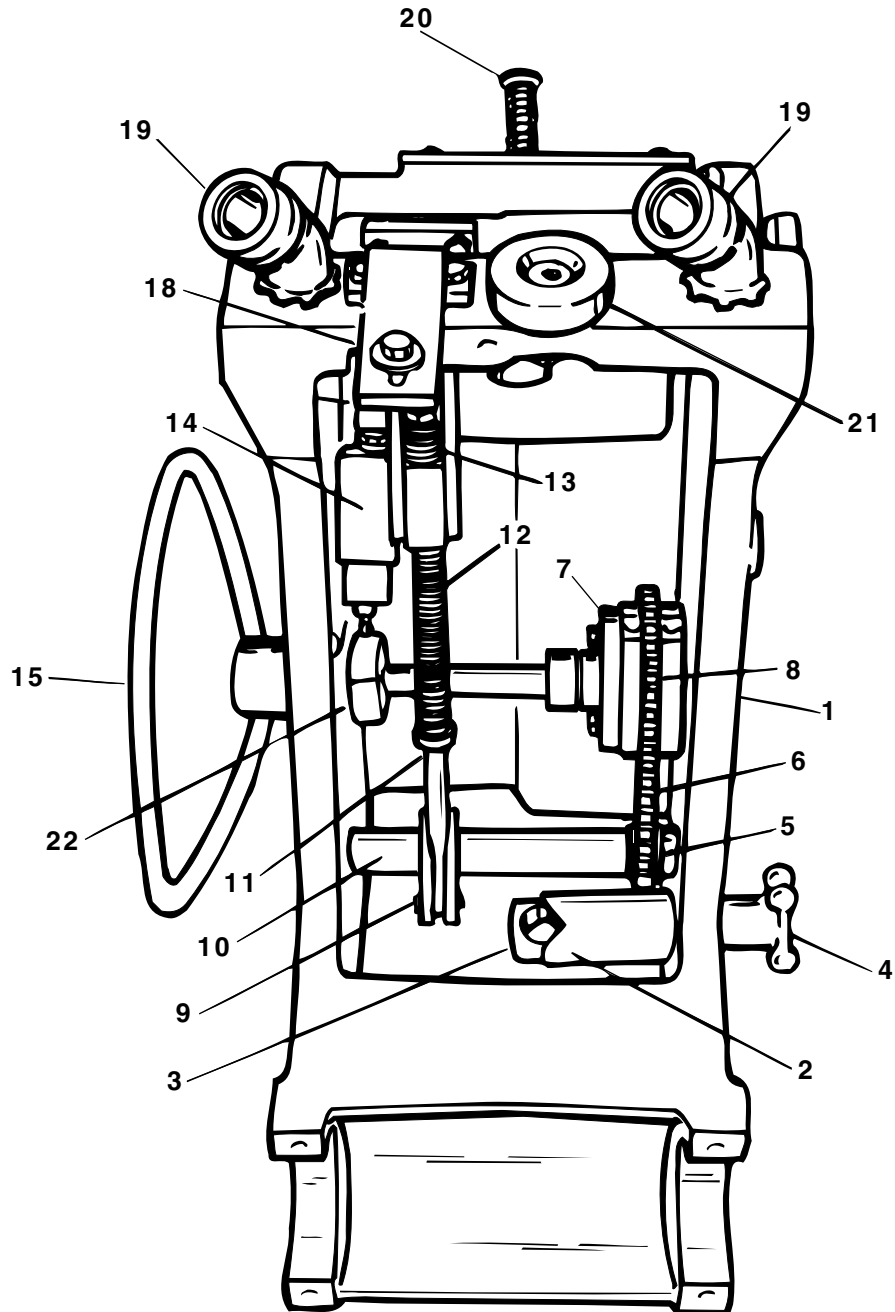


FIGURE E - CARRIAGE ASSEMBLY

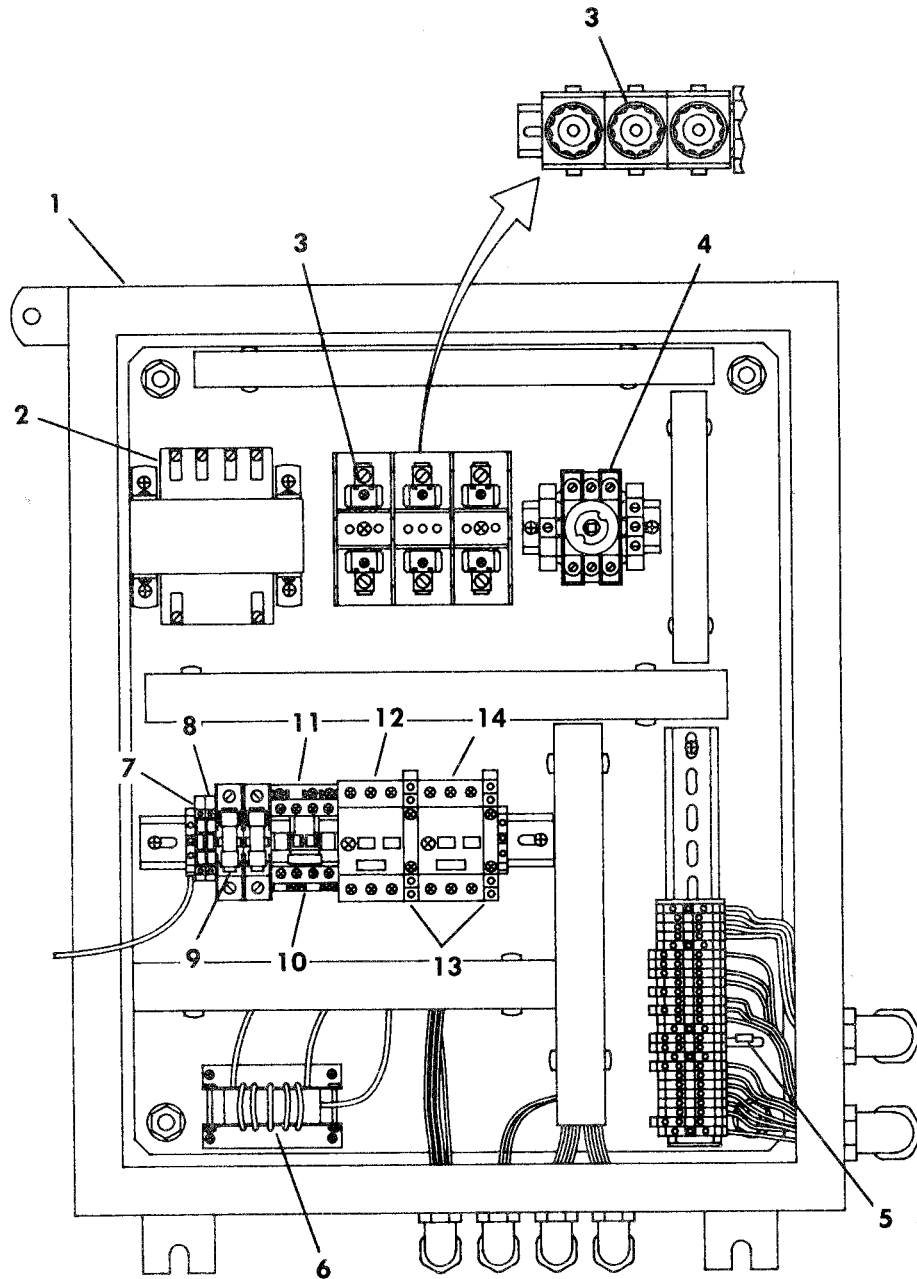
**PARTS LIST COVERING FIGURE "E"**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
1	CK-707A	2	....Bushings
2	CK-780A	1	....Oil Spout Sleeve
3	CK-781A	1	....Clamp Nut
4	CK-775A	1	....Clamp Knob Assembly with
		1	.....Washer (Special)
5	CK-734A	1	....Sprocket with Set Screw
6	CK-723A	1	....Chain with
		1	.....Adjusting Block
		2	.....Screws (5/16-24 x 1-1/4 Nylok Soc. Hd. Cap)
		1	.....Pin
7	CK-718A	1	....Adjusting Flange with
		1	.....Screw (1/4-20 x 1" Soc. Hd. Cap)
		2	.....Washers (Special)
		2	.....Screws (3/8-16 x 1-1/4 Hex Hd. Cap)
8	CK-721A	1	....Pulley
9	CV-730A	1	....Lever Assembly with
		1	.....Set Screw (3/8-16 x 5/8 Soc. Plain Cup Pt.)
10	CK-728A	1	....Lower Control Shaft with
		1	.....Key (1/4 Sq. x 3/4 Long)
	PHR-312A	1	.....Retaining Ring
		1	.....Washer (1" Plain)
	PHR-311A	1	.....Retaining Ring
		1	.....Washer (1-1/4 Plain)
N/S	PBR-19A	1	.....Bearing - Lever Side
N/S	PBR-10A	1	.....Bearing - Sprocket Side
11	CV-745A	1	....Compression Link Assembly with
		1	.....Stop Collar
		1	.....Set Screw (1/4-20 x 1/2 Soc. Cup Pt.)
12	CK-758A	1	.....Spring
13	CV-759A	1	.....Spring with
		1	.....Washer (1/2 Plain)
		1	.....Locknut (1/2-20)
		1	.....Clevis Pin
		1	.....Clevis Pin
	PHR-305A	2	.....Retaining Rings (Pkg. of 1)
14	CK-362A	1	....Safety Switch
15	CK-710A	1	....Upper Control Shaft & Lift Lever Assembly with
		1	.....Key (3/16 Sq. x 3/4 Long)
		1	.....Washer (Special)
	PHR-310A	1	.....Retaining Ring
17	CK-764A	1	....Shoe with
		1	.....Washer (3/8 Plain)
		1	.....Screw (3/8-16 x 1" Hex Hd. Cap)
18	CV-763A	1	....Carriage Hold Down Strap with
		2	.....Screws (3/8-16 x 1" Hex Hd. Cap)
19	PEC-106A	2	....Cable Connector (Pkg. of 1) with
		2	.....Locknut (1" NPT)
20	CV-660A	1	....Shock Absorber Assembly with
		1	.....Shock Absorber Plate
		4	.....Screws (1/4-20 x 3/4 Hex Hd.)
21	CV-770A	1	....Carriage Roller & Bearing Assembly with
		1	.....Nut (1/2-20 Hex)
22	CK-772A	1	....Cam with
		1	.....Screw (1/4-20 x 1-3/4 Soc. Hd. Cap)
		1	.....Washer (1/4 Lock)

N/S indicates Not Shown

(Parts continued on next page)

**SECTION III**  
**ELECTRICAL COMPONENTS**



**FIGURE F - ELECTRICAL PANEL**



**PARTS LIST COVERING FIGURE "F"**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
<b>1</b>		<b>1</b>	<b>....Electrical Panel <i>includes</i></b>
2	PEM-554A	1	.....Control Transformer (208, 230, 460 Volt, 60 Hz)
2	PEM-555A	1	.....Control Transformer (220, 380, 440 Volt, 50 Hz)
3	PEF-161A	3	.....Fuse, JTD15 (208, 230 Volt, 60 Hz) (Pkg. of 1)
3	PEF-162A	3	.....Fuse, JTD8 (460 Volt, 60 Hz) (Pkg. of 1)
3	PEF-156A	3	.....Fuse, 16 Amp, Diazed (220 Volt, 50 Hz) (Pkg. of 1)
3	PEF-115A	3	.....Fuse, 10 Amp, Diazed (380, 440 Volt, 50 Hz) (Pkg. of 1)
4	PES-297A	1	.....Disconnect Switch
5	PED-34A	1	.....Resistor, .1 Ohm, 3W
6	PEM-514A	1	.....Current Transformer
7	PEF-114A	1	.....Fuse, 2 Amp, 5x20 mm, slow-blow
8	PEF-163A	1	.....Fuse, .5 Amp, 5x20 mm, slow-blow
9	PEF-23A*	2	.....Fuse, KLDR1.5, Class CC (208, 230, 460 Volt, 60 Hz)(Pkg. of 1)
10	PES-458A	1	.....Contactor, 12 Amp
11	PES-405A	1	.....Surge Absorber
12	PES-413A	1	.....Motor Starter (208, 230 Volt, 60 Hz 1220 Volt, 50 Hz)
12	PES-414A	1	.....Motor Starter (460 Volt, 60 Hz 1380, 440 Volt, 50 Hz)
13	PES-422A	2	.....Aux Contact (Pkg. of 1)
14	PES-414A	1	.....Motor Starter (208, 230 Volt, 60 Hz 1220 Volt, 50 Hz)
14	PES-457A	1	.....Motor Starter (380, 440 Volt, 50 Hz)
14	PES-415A	1	.....Motor Starter (460 Volt, 60 Hz)

SECTION III  
ELECTRICAL COMPONENTS

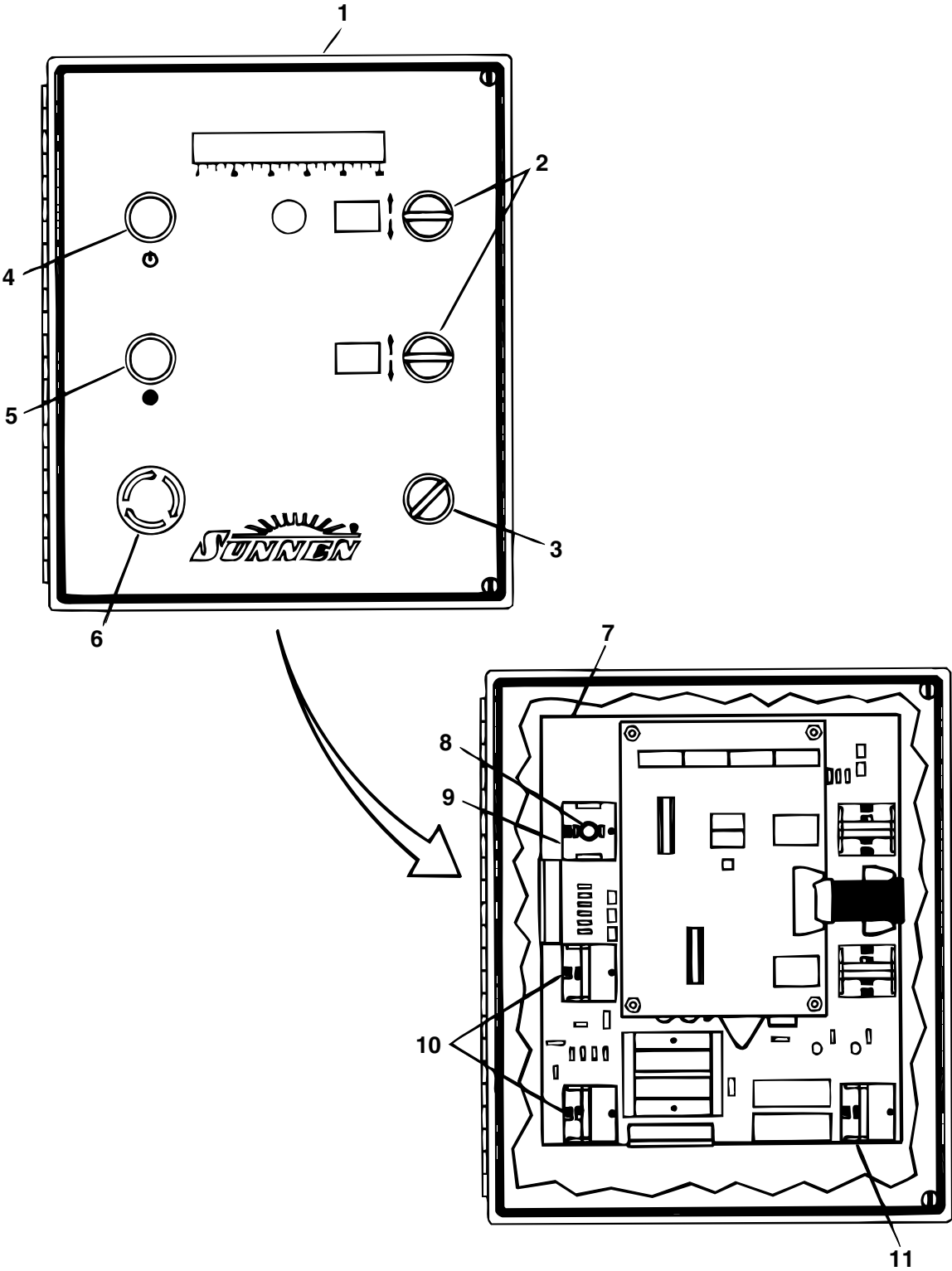


FIGURE G – OPERATOR STATION

**PARTS LIST COVERING FIGURE "G"**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
<b>1</b>		<b>1</b>	<b>....Operator Station Includes</b>
2	PES-396A	2	.....3 Position Selector, Momentary (Pkg. of 1)
3	PES-394A	1	.....2 Position Selector, Maintained
4	PES-387A	1	.....White Illuminated Push Button Operator
5	PES-393A	1	.....Red Push Button Operator
6	PES-386A	1	.....Emergency Stop Operator
7	CV-1627A	1	.....Circuit Board Assembly
8	PED-1036A	1	.....24 Volt Lamp
9	PES-383A	1	.....Normally Open Contact Block/Lamp skt.
10	PES-384A	2	.....Normally Closed Contact Block (Pkg. of 1)
11	PES-385A	5	.....Normally Open Contact Block (Pkg. of 1)

N/S indicates Not Shown

SECTION IV  
BASE ASSEMBLY

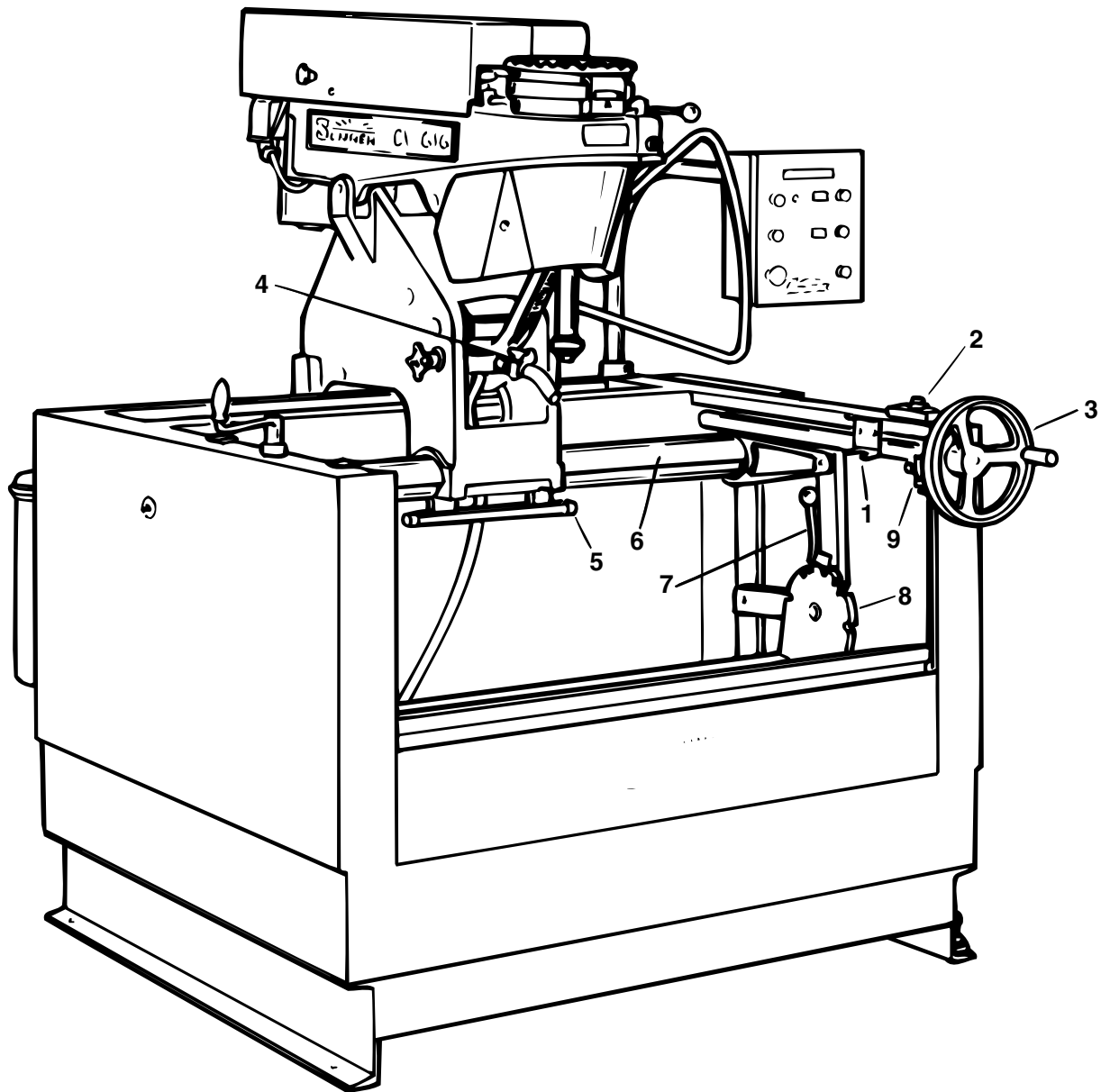


FIGURE H – RIGHT FRONT VIEW

**PARTS LIST COVERING FIGURE "H"**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
<b>1</b>	<b>CK-3006A</b>	<b>1</b>	<b>....Gage Hanger</b> <i>with</i>
		1	.....Clamp
		2	.....Screw (1/4-20 x 1/2 Hex Hd. Cap)
<b>2</b>	<b>CK-1411A</b>	<b>1</b>	<b>....Push Button Unit</b> <i>with</i>
		1	....."Dwell" Plate
<b>3</b>	<b>CK-1095A</b>	<b>1</b>	<b>....Hand Wheel Assembly</b> <i>with</i>
		1	.....Set Screw (3/8-16 x 1/2 Soc. Cup Pt.)
		1	.....Teflon Washer
<b>4</b>	<b>CK-1324A</b>	<b>1</b>	<b>....Shut Off Valve</b>
<b>5</b>	<b>CK-1084A</b>	<b>2</b>	<b>....Bumpers</b> (Pkg. of 2)
<b>6</b>	<b>CK-1085A</b>	<b>1</b>	<b>....Guard Assembly</b>
<b>7</b>	<b>CK-1175A</b>	<b>1</b>	<b>....Position Latch</b> (Includes Knob) <i>with</i>
		1	.....Groove Pin
		1	.....Spring
<b>8</b>	<b>CV-1180A</b>	<b>1</b>	<b>....Cradle Assembly</b>
<b>N/S</b>	<b>CK-1010A</b>	<b>2</b>	<b>....Non-Splash Screen</b> (Pkg. of 1)
<b>N/S</b>	<b>CK-985A</b>	<b>4</b>	<b>....Settling Pan</b> (Pkg. of 1)

*N/S indicates Not Shown*

SECTION IV  
BASE ASSEMBLY

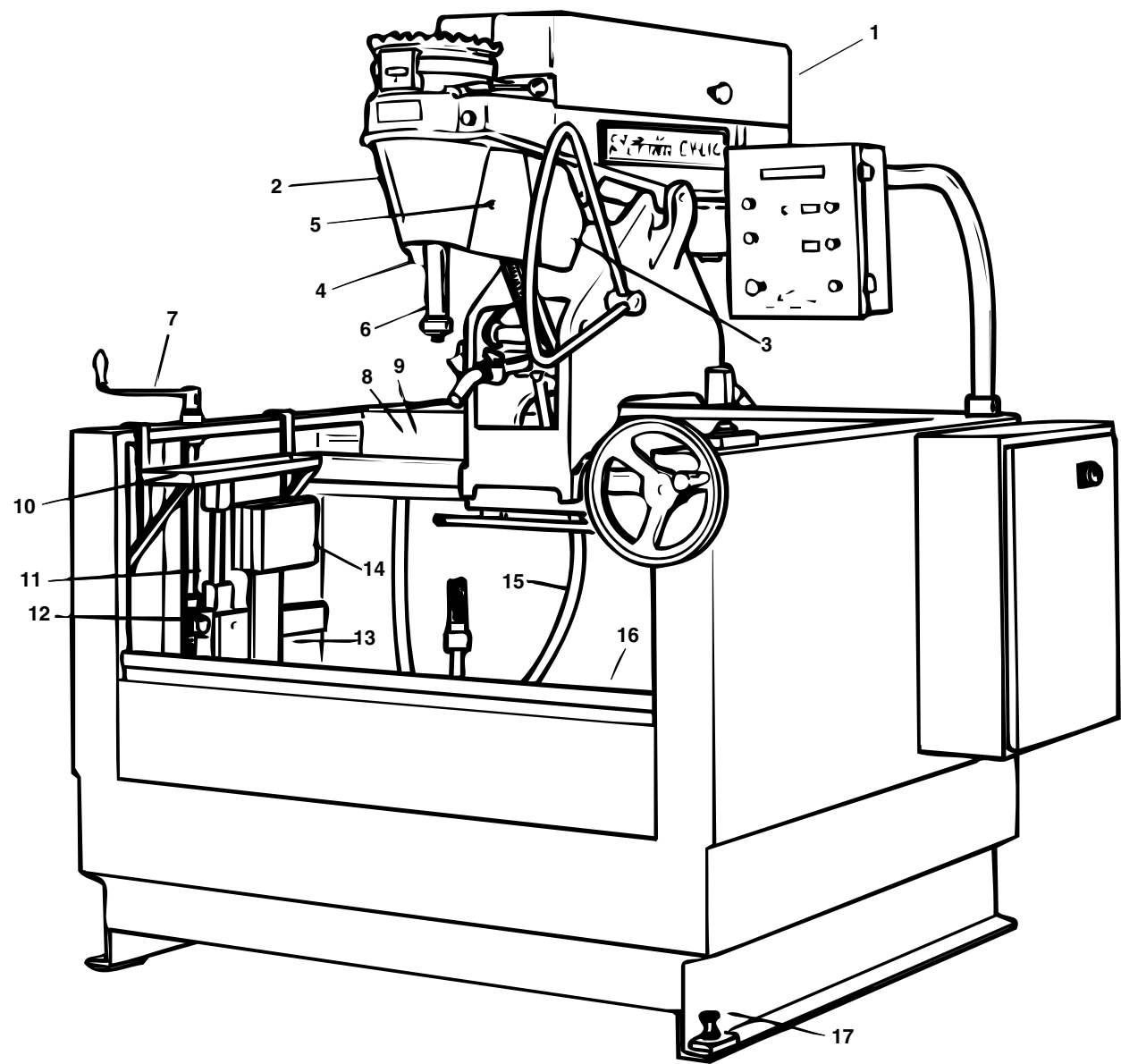


FIGURE I - LEFT FRONT VIEW

**PARTS LIST COVERING FIGURE "I"**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
<b>1</b>	<b>CV-575A</b>	<b>1</b>	<b>....Belt Cover Assembly</b>
	<b>CV-1915A</b>		<b>....Drive Tube Guard Kit</b> <i>Consists of</i>
2	CV-1925A	1	.....Guard Cone <i>with</i>
		3	.....Nuts (1/4-20 J-Nut)
		3	.....Screws (1/4-20 x 5/8 Soc. But. Hd. Cap)
3	CV-1905A	1	.....Right Guard <i>with</i>
		1	.....Nut Strip
		2	.....Screws (1/4-20 x 3/4 Soc. But. Hd. Cap)
5	CV-1920A	1	.....Door Latch
4	CV-1910A	1	.....Left Guard <i>with</i>
		1	.....Nut Strip
		2	.....Screw (1/4-20 x 3/4 Soc. But. Hd. Cap)
5	CV-1920A	1	.....Door Latch
<b>6</b>		<b>1</b>	<b>....Drive Tube</b> <i>(See Fig. B)</i>
<b>7</b>	<b>CHV-199A</b>	<b>1</b>	<b>....Handle</b>
<b>8*</b>	<b>CK-1078A</b>	<b>1</b>	<b>....Carriage Traversing Chain</b> <i>with</i>
		1	.....Connecting Link
<b>9*</b>	<b>CK-1105A</b>	<b>1</b>	<b>....Chain Tensioning Sprocket Block Assembly</b> <i>with</i>
		1	.....Screw (1/2-13 x 4-1/2 Hex Hd. Cap)
		1	.....Screw (1/2-13 x 3/4 Hex Hd. Cap)
		2	.....Washer (1/2 Plain)
		1	.....Washer (1/8 Thick)
<b>10</b>	<b>CK-1020A</b>	<b>1</b>	<b>....Tool Rack</b>
<b>11</b>	<b>CK-1120C</b>	<b>1</b>	<b>....Elevating Screw Assembly</b> <i>with</i>
	PBR-21A	1	.....Thrust Bearing
<b>12</b>	<b>CK-1134A</b>	<b>1</b>	<b>....Elevating Adjusting Nut</b> <i>with</i>
	PHR-313A	1	.....Retaining Ring
	<b>CV-1220A</b>		<b>....Cradle Counterweight Kit</b> - Optional (Not Supplied w/Machine) <i>Consists of</i>
13		1	.....Upright Assembly
		1	.....Screw (5/8-11 x 3" Hex Hd. Cap)
		1	.....Washer (Special)
14	CV-1223A	4	.....Counterweights (Pkg. of 1) <i>with</i>
		8	.....Screw (3/8-16 x 1-1/2 Hex Soc. Hd. Cap)
<b>15</b>	<b>CK-1309A</b>	<b>1</b>	<b>....Hose</b> <i>with</i>
		2	.....Hose Clamps
<b>16</b>	<b>CK-980C</b>	<b>1</b>	<b>....Front Doors</b> (Upper, Center & Lower Sections)
<b>17</b>	<b>PHS-523A</b>	<b>1</b>	<b>....Leveling Screw</b> <i>with</i>
		1	.....Nut (3/4-16 Hex Jam)
<b>N/S</b>	<b>CK-3410A</b>	<b>1</b>	<b>....Lamp &amp; Bracket</b> - Optional (Not Supplied with Machine)

N/S indicates Not Shown

\*These two items are not visible in the illustration, as both are covered by the protective shield.

SECTION IV  
BASE ASSEMBLY

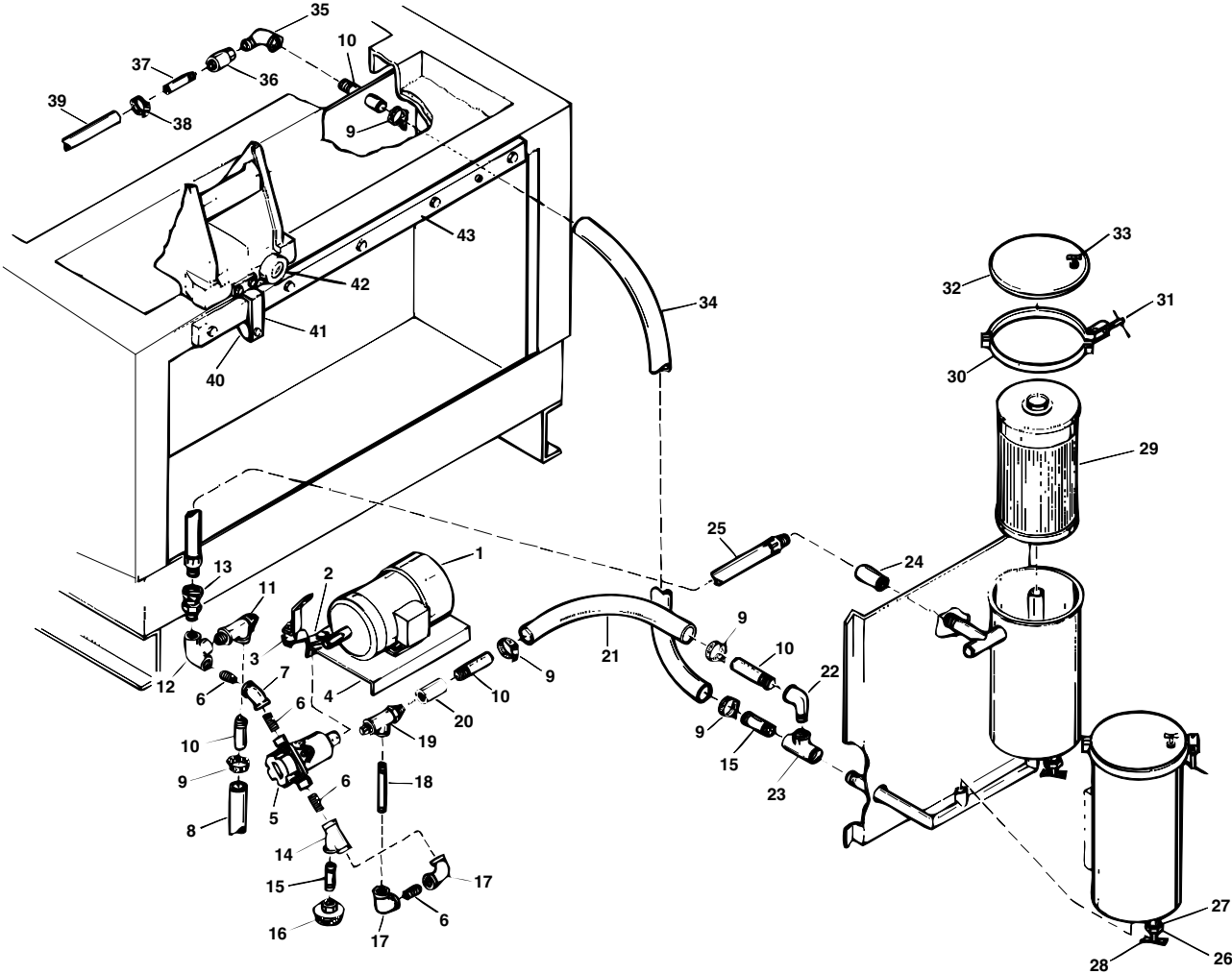


FIGURE J – REAR VIEW



**PARTS LIST COVERING FIGURE "J"**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
1	PMO-560A	1	....Pump Motor (230/460 Volt, 60 Hz)
1	PMO-562A	1	....Pump Motor (220/380 Volt, 50 Hz)
1	PMO-563A	1	....Pump Motor (440 Volt, 50 Hz)
1	PMO-564A	1	....Pump Motor (208 Volt, 60 Hz)
2	CH-371A	1	....Pump Bracket
3	PF-224D	1	....Flex Bolt Mounting <i>with</i>
		2	.....Nut (5/16-18 Hex)
		1	.....Washer (5/16 Plain)
		1	.....Washer (5/16 Lock)
4	PF-1036C	1	....Base <i>with</i>
	PF-224C	4	.....Flex Bolt (Pkg. of 1) <i>with</i>
		2	.....Washer (5/16 Plain)
		2	.....Nut (5/16-18 Hex)
		1	.....Spacer
5	CK-1388A	1	....Pump (10 G.P.M., 1750 R.P.M. & 5/8 Hollow Shaft)
N/S	PF-177A	1	....Seal Kit (Replacement Seal for item #5)
6	PPP-152A	3	....Nipple (3/4 N.P.T.) (Pkg. of 1)
7	PPP-334A	1	....Elbow (3/4 N.P.T.)
8	CV-1393A	1	....Hose (1" I.D. x 40" Long Vinyl Tubing) <i>with</i>
9		1	.....Clamp
10	CK-1306A	3	....Pipe (3/4 N.P.T. x 3-1/2 Long) (Pkg. of 1)
11	CK-1389A	1	....Relief Valve (Pressure Setting 45 p.s.i.)
12	PPP-154A	1	....Side Outlet Elbow (3/4 N.P.T.)
13	PPP-181A	1	....Swivel Adapter (3/4 N.P.T.F. male x 1" N.P.S.M. female thread)
14	PPP-330A	1	....Lateral (3/4 N.P.T.)
15	PPP-331A	1	....Nipple
16	PPP-332A	1	....Suction Screen
17	MAN-1079A	2	....Elbow (3/4 N.P.T.)(Pkg. of 1)
18	PPP-333A	1	....Nipple (3/4 N.P.T.)
19	PPP-208A	1	....Low Pressure Relief Valve (Pressure Setting 10 p.s.i.)
20	PPP-209A	1	....Coupling (3/4 N.P.T.)
21	CV-1394A	1	....Hose (1" I.D. x 19" Long Vinyl Tubing) <i>with</i>
9		2	.....Clamp
22	CK-1279A	1	....Street Elbow (3/4 x 3/4 x 90° Iron)
23	PPP-201A	1	....Tee (3/4 NPT)

N/S indicates Not Shown

(Parts continued on next page)

**SECTION IV**  
**BASE ASSEMBLY**

**PARTS LIST COVERING FIGURE “J” (cont’d)**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
	<b>CK-1710A</b>	<b>1</b>	<b>....Filter Canister &amp; Hose Assembly Includes</b>
24	PPP-344A	1	.....Pipe Coupling
25	PPP-19A	1	.....Hose (1” I.D. x 46” Long <i>with</i> 1” N.P.T. Couplings)
26	PF-257A	2	.....Stand Pipe (Pkg. of 1)
27	PF-258A	2	.....Washer (Fiber)(Pkg. of 2)
28	PF-259A	2	.....Draincock (Pkg. of 1)
29	PF-105-4	2	.....Filter Element (5 Micron)(Pkg. of 4)
	PF-110-4	2	.....Filter Element (10 Micron) (Pkg. of 4) – Optional
30	PF-260A	2	.....Clamp Assembly (Pkg. of 1) <i>with</i>
31	PF-270A	2	.....Tee Handle Assembly (Pkg. of 1)
N/S	PF-244A	2	.....Gasket (Pkg. of 1)
N/S	PF-247A	2	.....Hold Down Spring (Pkg. of 1)
32	PF-243A	2	.....Cover (Pkg. of 1)
33	PF-246A	2	.....Air Vent (Pkg. of 1)
<b>34</b>	<b>CV-1393A</b>	<b>1</b>	<b>....Hose</b>
<b>35</b>	<b>PPP-129A</b>	<b>1</b>	<b>....Reducing Street Elbow (3/4 x 1/2 x 90°)</b>
<b>36</b>	<b>PPP-335A</b>	<b>1</b>	<b>....Check Valve (1/2 N.P.T.)</b>
<b>37</b>	<b>PPP-147A</b>	<b>1</b>	<b>....Nipple (1/2 N.P.T. x 1-1/8 Long)</b>
<b>38</b>		<b>1</b>	<b>....Clamp</b>
<b>39</b>	<b>CK-1309A</b>	<b>1</b>	<b>....Hose (3/4 I.D. x 57” Long Vinyl Tubing)</b>
<b>40</b>	<b>CK-764A</b>	<b>1</b>	<b>....Shoe <i>with</i></b>
		1	.....Washer
		1	.....Screw (3/8-16 x 1” Hex Hd. Cap)
<b>41</b>	<b>CV-763A</b>	<b>1</b>	<b>....Hold Down Strap <i>with</i></b>
		2	.....Washer (3/8 Lock)
		2	.....Screw (3/8-16 x 1” Hex Hd. Cap)
<b>42</b>	<b>CV-770A</b>	<b>1</b>	<b>....Roller &amp; Bearing Assembly <i>with</i></b>
		1	.....Nut (1/2-20 Hex Jam)
<b>43</b>	<b>CK-1029C</b>	<b>1</b>	<b>....Rear Rail <i>with</i></b>
		7	.....Washer
		5	.....Screw (3/8-16 x 1-3/4 Hex Hd. Cap)
		2	.....Shoulder Screw (3/8 x 1” Soc. Hd. <i>with</i> 5/16-18 x 1/2 Thread)
<b>N/S</b>	<b>PHS-50A</b>	<b>1</b>	<b>....Hex Key Kit (Consists of 13 Keys, size .050 thru 3/8)</b>

N/S indicates Not Shown

## SECTION V OPTIONAL ITEMS

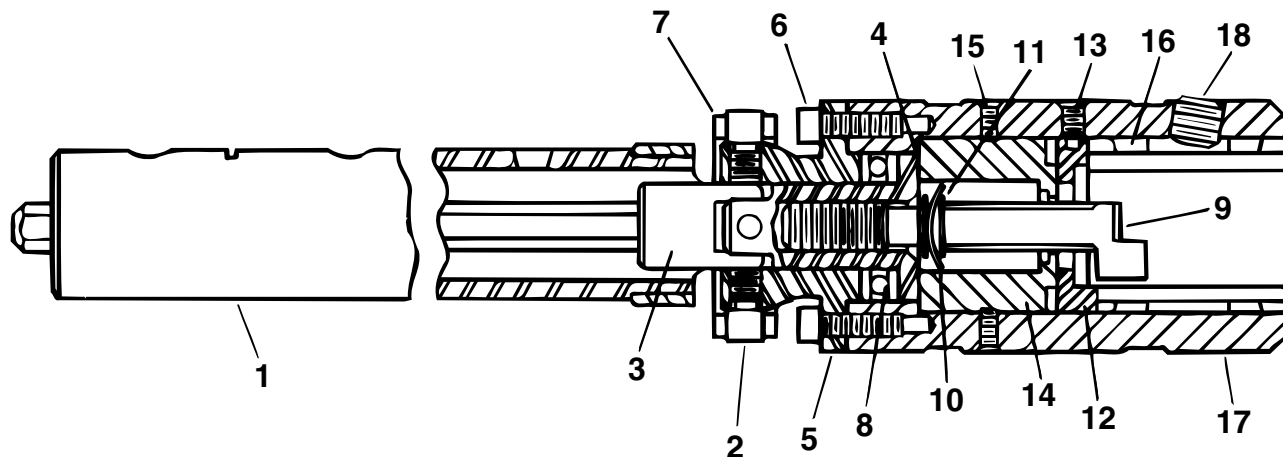


FIGURE K – MANDREL ADAPTER UNIT  
PARTS LIST COVERING FIGURE “K”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
	<b>CV-1010</b>	<b>1</b>	<b>....Mandrel Adapter Unit Complete</b> <i>Consist of</i>
1	CV-1065A	1	.....Drive Tube - Lower <i>Includes</i>
7	CK-3033A	1	.....Lower Universal Ring
	AN-621C	1	.....Screw (Pkg. of 4)
2	AN-621A	2	.....Screws (5/16-24 x 15/32 Soc. Hd.)
	PHS-698A	2	.....Screws (5/16-24 x 3/8 Soc. Hd.)
3	CV-1055A	1	.....Feed Rod Assembly - Lower <i>with</i>
4	CK-123A	1	.....Nylon Thrust Washer
5	CV-1059A	1	.....Driver <i>with</i>
6	PHS-582A	4	.....Screws (1/4-20 x 3/4 Soc. Hd. Cap)(Pkg. of 4)
8	PBR-38A	1	.....Thrust Bearing
9	CV-1045A	1	.....Feed Screw <i>with</i>
10	CRG-396A	1	.....Spring Washer
11	PHR-323A	2	.....Retaining Ring
12	MBB-642A	1	.....Drive Plate <i>with</i>
13		1	.....Set Screw (1/4-20 x 3/8 Soc. Hd. Full Dog Pt.)
14	CV-1041A	1	.....Flange <i>with</i>
15		2	.....Set Screws (10-24 x 1/4 Soc. Hd. Cup Pt.)
16	LN-0116A	1	.....Eccentric Sleeve
16	LN-570A	1	.....Concentric Sleeve
17	CV-1040A	1	.....Spindle Nose <i>with</i>
13		1	.....Set Screw (1/4-20 x 3/8 Soc. Hd. Full Dog Pt.)
15		2	.....Set Screw (10-24 x 1/4 Soc. Hd. Cup Pt.)
18	LBN-346A	1	.....Set Screw (1/2-13 x 7/16 Soc. Hd. Flat Pt.)
N/S	LBN-462A	1	.....Mandrel Wrench

N/S indicates Not Shown

**SECTION V**  
OPTIONAL ITEMS

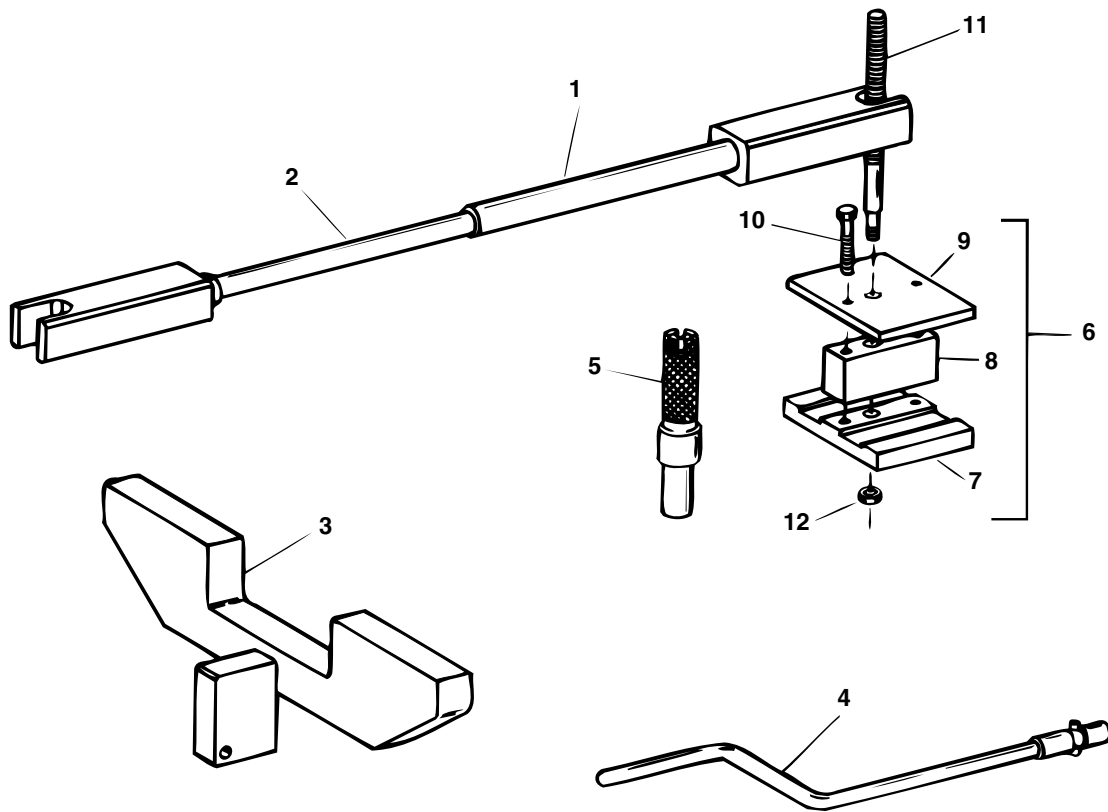


FIGURE L – CLAMP KIT

**PARTS LIST COVERING FIGURE “L”**

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
1	<b>CK-1200</b>	<b>1</b>	<b>....Clamp Kit Includes</b>
2		1	.....Outside Clamp Bar
3		1	.....Inside Clamp Bar
4		2	.....Cross Bar Assembly
5	CK-1215A	1	.....Crank Assembly
6	CK-1213A	2	.....Clamp Nut (Pkg. of 1)
7	CK-1206A	2	.....Plate & Block Kit (Pkg. of 1) <i>with</i>
8		1	.....Lower Plate
9		1	.....Block
10		1	.....Top Clamp Plate
11	CK-1208A	2	.....Screw (3/8-16 x 2-1/2 Hex Hd. Cap)
12		2	.....Stud (Pkg. of 1) <i>with</i>
N/S		2	.....Locknut
		1	.....Counterweight

*N/S indicates Not Shown*

## NOTES

## NOTES

Like any machinery, this equipment may be dangerous if used improperly. Be sure to read and follow the instructions for the operation of the equipment.

# FRACTION / DECIMAL / MILLIMETER EQUIVALENTS CHART

INCH			INCH			INCH		
FRACTION	DECIMAL	MILLIMETER	FRACTION	DECIMAL	MILLIMETER	FRACTION	DECIMAL	MILLIMETER
....	.003937	0,1000	9/32	.281250	7,1438	21/32	.656250	16,6688
....	.007874	0,2000	19/64	.296875	7,5406	....	.669291	17,0000
....	.011811	0,3000	5/16	.312500	7,9375	43/64	.671875	17,0656
1/64	.015625	0,3969	....	.314961	8,0000	11/16	.687500	17,4625
....	.015748	0,4000	21/64	.328125	8,3344	45/64	.703125	17,8594
....	.019685	0,5000	11/32	.343750	8,7313	....	.708661	18,0000
....	.023622	0,6000	....	.354331	9,0000	23/32	.718750	18,2563
....	.027559	0,7000	23/64	.359375	9,1281	47/64	.734375	18,6531
1/32	.031250	0,7938	3/8	.375000	9,5250	....	.748031	19,0000
....	.031496	0,8000	25/64	.390625	9,9219	3/4	.750000	19,0500
....	.035433	0,9000	....	.393701	10,0000	49/64	.765625	19,4469
....	.039370	1,0000	13/32	.406250	10,3188	25/32	.781250	19,8438
3/64	.046875	1,1906	27/64	.421875	10,7156	....	.787402	20,0000
1/16	.062500	1,5875	....	.433071	11,0000	51/64	.796875	20,2406
5/64	.078125	1,9844	7/16	.437500	11,1125	13/16	.812500	20,6375
....	.078740	2,0000	29/64	.453125	11,5094	....	.826772	21,0000
3/32	.093750	2,3813	15/32	.468750	11,9063	53/64	.828125	21,0344
7/64	.109375	2,7781	....	.472441	12,0000	27/32	.843750	21,4313
....	.118110	3,0000	31/64	.484375	12,3031	55/64	.859375	21,8281
1/8	.125000	3,1750	1/2	.500000	12,7000	....	.866142	22,0000
9/64	.140625	3,5719	....	.511811	13,0000	7/8	.875000	22,2250
5/32	.156250	3,9688	33/64	.515625	13,0969	57/64	.890625	22,6219
....	.157480	4,0000	17/32	.531250	13,4938	....	.905512	23,0000
11/64	.171875	4,3656	35/64	.546875	13,8906	29/32	.906250	23,0188
3/16	.187500	4,7625	....	.551181	14,0000	59/64	.921875	23,4156
....	.196850	5,0000	9/16	.562500	14,2875	15/16	.937500	23,8125
13/64	.203125	5,1594	37/64	.578125	14,6844	....	.944882	24,0000
7/32	.218750	5,5563	....	.590551	15,0000	61/64	.953125	24,2094
15/64	.234375	5,9531	19/32	.593750	15,0813	31/32	.968750	24,6063
....	.236220	6,0000	39/64	.609375	15,4781	....	.984252	25,0000
1/4	.250000	6,3500	5/8	.625000	15,8750	63/64	.984375	25,0031
17/64	.265625	6,7469	....	.629921	16,0000	1	1.000000	25,4000
....	.275591	7,0000	41/64	.640625	16,2719	1-1/16	1.062500	26,9880

## FORMULAS:

MULTIPLY BY TO GET  
 INCHES (in) x 25.4 = MILLIMETERS (mm)  
 FEET (ft) x 0.3048 = METERS (m)

MULTIPLY BY TO GET  
 MILLIMETERS (mm) x 0.03937 = INCHES (in)  
 METERS (m) x 3.281 = FEET (ft)

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